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THE EFFICACY OF MAGNITUDE AND MULTIDIMENSIONAL SCALING OF RATIO JUDGMENTS ABOUT THE REALITIES AND EXIGENCIES OF LIFE

by

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Submitted in partial fulfilment
of the requirements of the degree of
Doctor of Philosophy

Faculty of Graduate Studies

The University of Alberta
Edmonton, Alberta
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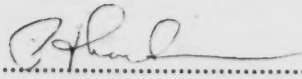

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ABSTRACT

The purpose of the research was to test the efficacy of magnitude and multidimensional methods of scaling of ratio judgments about the strain of life events, experiences and perceptions. In order to accomplish this objective the problems associated with the measurement of strain to the realities and exigencies of life were outlined; the literature on the methodological issues was reviewed; tests of the efficacy of a linear model as compared to logarithmic transformation of raw values, rescaling to a common metric, logarithmic transformation of rescaled values, and multidimensional scaling were reported for 304 research participants; and a magnitude scale of the realities and exigencies of life was presented. The evaluation of four methods of scaling focused on the yield rates of statistically significant correlations under the null hypothesis. As compared to routine linear correlational analysis, the logarithm of raw score values and rescaling to a common metric were found to yield higher rates of statistically significant correlation coefficients. In the second stage of the research a magnitude scale of the realities and exigencies of life was assessed. The results indicated that magnitude and multidimensional scaling are superior reflections of the domain of life events, experiences, and perceptions than are simple arrays of these items.

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CHAPTER I

OVERVIEW

1.1 Introduction

This chapter provides an overview of the investigation. Five critical issues in the literature of life events, life experiences, and life perceptions (hereafter referred to as life events, experiences, and perceptions) are presented. A plan of investigation and the scope of the research is described. Lastly, an outline of the rest of the dissertation is presented.

1.2 The Study of Stress

The PsycLit Database (Psychological Abstracts, January 1, 1983 - June, 1989) alone, contains over 9,900 articles giving reference to the topic of stress, which attests to the high level of interest researchers have for the topic. Most of the research on the relationship between stress and various social as well as health related variables has been non-experimental and this research has been based primarily on the study of life events in relation to either epidemiology or clinical practice. Reviews of the results of studies in these two specific areas indicate substantial inconsistency of findings as, also, do the reviews of the general literature on stress.

1.2.1 Problems With the Study of Stress

Five critical issues emerge from the literature reviews of the non-experimental research across a wide array of life events, experiences and

perceptions under which most of the methodological problems articulated can be subsumed:

1. Is magnitude scaling possible for the wide array of life events, experiences and perceptions?
2. Is the array multidimensional or unidimensional?
3. Can a typology of persons in terms of life events, experiences and perceptions be constructed?
4. Can retrospective bias and other contaminants of response consistencies be surmounted in the study of the array of life events, experiences, and perceptions?
5. Can a more rigorous methodology be brought to bear on the study of the wide array of life events, experiences, and perceptions?

1.2.2 Plan of Investigation

This research investigates the first two critical issues which arise primarily from definitional difficulties and problems in instrumentation. The third issue the construction of a typology of persons - was delimited from the present study and was considered as a worthy topic for subsequent research. The fourth and fifth critical issues are embedded in both the limitations and restrictions of the research design employed by investigators, and are subsequently discussed in the context of the results obtained from this investigation. Investigation of these critical issues is important to surmounting the methodological problems currently encumbering

the study of the implications with respect to life stresses and their respective strain(s).

1.3 Statement of Objectives

The purpose of the dissertation is to investigate the efficacy of magnitude and multidimensional methods of scaling of ratio judgments about life events, experiences and perceptions. In order to accomplish this objective the problems associated with the measurement of strain to the realities and exigencies of life are outlined and the literature on the methodological issues is reviewed. Tests of the efficacy of a linear correlational model as compared to common logarithm (base 10) raw values, rescaled values to a common metric, logarithm (base 10) of rescaled values, and multidimensional scaling are evaluated. A magnitude scale of the realities and exigencies of life is constructed.

1.4 Scope of the Research

Given the overall difficulties associated with the research on life events, it is not surprising that the majority of the papers reviewing the literature in both the general stress and life event areas have called for more sensitive and adequate methodology to investigate the numerous design problems that have surfaced within the literature. While the analyses pertaining to multidimensional versus unidimensional and magnitude versus linear scaling is concerned with the mapping of the array of life events, information is needed on the typology of persons reflected through various configurations of life events. For example, Cohen,

McGowan, Fooskas, and Rose (1984) as well as Frank, Van-Valin, and Weinstein (1982) have noted that some individuals are prone to more negative life events than others. Further knowledge of such a typology of persons is needed in order to subsequently address the implications of subscription to particular combinations of life events, experiences, and perceptions. For example, to some individuals, meaninglessness may be viewed as positive under a particular combination of life event circumstances but not under another combination. Individuals, for example, who have experienced a particular series of life events (e.g., rejection - success - rejection) may be more overwhelmed by this sequence than had they experienced a different and perhaps more arduous series (e.g., rejection - rejection - rejection) or alternatively a series of two events of larger stress magnitude (e.g., two house mortgages). Such knowledge is particularly important to delineating any embedded relationships between life event stress and its manifestation in different symptoms. Though need exists for the construction of a typology of persons, such a study was considered to be beyond the scope of this research, though it is considered worthy of subsequent investigation. Future research can therein address the effects of environment which need to be extracted from effects attributable to stress (Person x Situation studies: Reppucci & Clingempeel, 1978), as well as explore the advantage of a single case design (Kazdin, 1978) to address the observation that self monitoring sometimes changes behavior as has been noted in research on smoking (McFall, 1978).

A second restriction of the research herein pertains to the numerous methodological problems associated with life event research. Zimmerman (1983a) has articulated nine common issues as follows:

i) symptom contamination of life event scales;

ii) the temporal relationship between events and illness;

iii) the dating of events and disorder;

iv) the content of life-event scales;

v) the generalizability of weights;

vi) the use of subjective ratings;

vii) the reliability of the reporting of life events;

viii) the scaling of positive and negative life events; and

ix) the relationship of positive events to mental health and illness.

While further examination of these methodological issues is beyond the scope of this specific review of the literature, it is noted that four of the issues (items: i, ii, iii and ix) pertain directly to studies of the association of life event stress and illness or disease. Such studies are outside of the focus of the present research. Items (iv, v, vi and viii) are investigated directly in this research. While the use of subjective ratings (item vi) is retained in this research, procedures exist for testing and/or circumventing this issue through alternate data collection as utilized in multitrait-multimethod designs (Campbell & Fiske, 1959) for assessing convergent and discriminant validity. At this point, it is important to assess first the feasibility of scaling the realities and exigencies of life before investigating the persistent bug-a-boo of the social sciences - notably, subjective responding. The research,

however, investigates the Between Subject component of the problem with subjective responding through the use of conversion of scores to a common metric. Though the total elimination of response bias is perhaps impossible (Jackson, 1970), the data collection procedures used for this research have been shown previously (Ruznisky & Thauberger, 1982) to have high reliability properties.

A third restriction of the research pertains to the problems of interpretation frequently encountered in the literature. More specifically, restraint will be exercised in searching the data for relationships to avoid drowning a few actual configurations or relations, that may appear in the data, in a wave of unreplicable chance relationships. Decision making rules will conform to parsimony so as to avoid scale proliferation as exists, for example, with other tests such as the Minnesota Multiphasic Personality Inventory (Butcher & Tellegen, 1978). As well, care will be used in the drawing of inferences so as to avoid over-interpretation from minor or scanty data. In addition, caution is exercised so as not to generalize any of the findings beyond the composition of the sample of participants. As an initial testing of the efficacy of the scaling procedures set out for this investigation, a catch-as-catch-can sample is adequate and sufficient. Generalization of any findings to a larger segment of humanity requires establishment of normative indicies. In essence, the research is considered a foundation for further study. Depending on the outcome of the investigation, a larger research project can be designed to determine base rates in the realities and exigencies of life, which Garfield (1978) has noted is crucial in clinical diagnosis. As well, such an inventory can be used in investigating the need to circumvent retrospective methodology in the study of stress (Eysenck, 1988; Schroeder & Costa, 1984).

1.5 Plan of the Dissertation

Chapter II is a review of the literature on the nature of stress, methodological problems associated with the issue of stress, and the relevance for inclusion of the existential content domain.

Chapter III contains the demographic information on the research participants, the materials used in the study, and the rationale and procedures for carrying out the research.

Chapter IV contains the results of the analyses pertaining to the evaluation of two experimental and two null hypotheses.

In Chapter V an interpretation of the meaning of the findings of the study and implications of the research are provided.

Chapter VI is in the concluding chapter. A recapitulation of the major results of the first five chapters, the limitations of the empirical research, and some possible directions for the future research are presented.

CHAPTER II

REVIEW OF THE LITERATURE

2.1 Introduction

Across the last several years, the issue of stress in both humans and animals has consistently comprised a significant portion of the topics of interest in the psychological research literature. More specifically, examination of the year by year citations to stress contained in the PsycLit Database (January, 1983 - June, 1989) found the subject of stress referenced in over 9,900 citations. The topic of stress is common in the popular literature as well, with numerous books, newspaper articles, magazine features, and self-help courses offering a wide array of commentary and perspectives ranging from the use of "Christmas amnesia" (Squires, 1988) in dealing with stress to "when stress closes in on you, ask God to show you the way of escape" (Shoaf, 1989, p. 6). In addition, the translation of Selye's work, alone, into over 30 different languages (Selye, 1980) further attests to the international appeal of the topic.

As expected with an increase in information, reaction to stress has modified with time. For example, Selye's (1956) initial forthright concern has tempered (Selye, 1974), as has Lazarus's (1971, 1975) to the point where Lazarus (1979) now posits a value to positive denial in dealing with stress. Of particular interest is the role that stress exerts in the ongoing physical as well as psychological health of the individual. Since the pioneering work of Cannon (1939) and Selye (1956),

who posited that life change creates a disequilibrium which imposes a requirement of readjustment, most of the non-experimental research on the relationship of stress and its influence on the cognitive, affective, motivational, and behavioral components of individuals has been based primarily on the study of life events. Suggestive links between the mind and body (e.g., Eysenck, 1988) are increasingly being reported, though researchers still remain unable to chart the mediating mechanisms between the psyche and maladies of physical, cognitive, affective, motivational or behavioral nature. This failure can be, in part, attributed to the bipolarity of responses (both proactive and reactive) to stress as well as the wide range of outcomes associated with the phenomenon of stress. Where some individuals appear to debilitate, even succumb to stress reactions (Eysenck, 1988), others appear to thrive (Tanner, 1976).

The delineation, however, of the mechanics of stress, its operation, contexts and intervening variables has proved to be a monumental task. While physiology has been able to calibrate a large number of chemical changes in the body under conditions of stress (Schmidt & Thews; 1983, Tortora, Evans, & Anagnostakos, 1982) these advances have not, as yet, shown much fruition in associating these changes with variations of needs, motivations, or the inferred dimensions from the study of symptoms i.e., such things as self concept, aggression, fears, phobias or the psychoses. Identification of maladies, illnesses or diseases attributable directly to stress are virtually non-existent, although DSM III-R (American Psychiatric Association, 1987) has attempted to distinguish such general syndromes as stress disorder and panic disorder from other psychosocial maladies. However, reviews

of the existing literature on stress across numerous situations and conditions have consistently revealed only mixed results.

2.2 Perspective

2.2.1 Current Findings

Because most of the material in the popular literature on stress (e.g., Nathan, Staats, & Rosch, 1987; Rudinger, 1988) has been distilled from the research of others, these sources, with a few exceptions, have been excluded from the review of the relevant literature. In fact, such sources typically overstate the case for intervention in that no research area examined yet has yielded consistent results overall, even though the number of areas examined has been quite diverse. Reviews of studies of the relationship between stress and disease as well as illness related areas such as schizophrenia (Gottesman, McGuffin, & Farmer, 1987; Tennant, 1985), depression in either adults (Nezu, 1987) or in children (Kestenbaum, 1982), ulcers (Ackerman & Shindledecker, 1987), cancer (Cunningham, 1985), parkinsonism (Bieliauskas, 1983; Zimmond & Stricker, 1984), arthritis (Koehler, 1985) and coronary difficulties (Herd, 1984; Pasnau, 1983; Roseman, 1985; Tennant, 1987; Verrier & Lown, 1984) indicate no more consistent results, than do reviews of studies in either the general psychotherapeutic area (Greenfeld, 1985; Vingerhoets, 1985), physiological (Linden & McEachern, 1985; Noyes, 1985), immunological (Goldberg, 1985; Pare & Glavin, 1986; Vassend, 1986) or general medical practice (Schulthesis, Peterson, & Selby, 1987; Wilson-Barnett, 1984a, 1984b) as well as in childbearing (Istvan, 1986; Mansfield & Cohn,

1986; Wasser & Isenberg, 1986), either in general coping (Schill, Ramanaiah, & O'Laughlin, 1984) or coping in hospital (Caty, Ellerton, & Ritchie, 1984; Wilson-Barnett, 1984a, 1984b). Similarly, reviews of drinking behavior in terms of stress related factors are also inconsistent (Allan & Cooke, 1985; Powers & Kutash, 1985; Winton, Heather, & Robertson, 1986) as is the research examining stress and general life events (Compas, 1987; Creed, 1985; Dohrenwend & Dohrenwend, 1974; Eysenck, 1988; Kessler, Price, & Wortman, 1985). It has become increasingly clear that most people who are exposed to stressful life events do not develop significant psychiatric impairments (Kessler, Price, & Wortman, 1985). In view of this and other findings, current investigators have attempted to focus on vulnerability or resistance factors that may influence individual reactivity to stressful life experiences. The two vulnerability factors of social support and coping strategies have received the most attention in this regard; however, several reviews of the literature indicate that the results of research in these areas have fared no better in consistency within either the general stress literature (Barrera, 1985; Camayd-Freixas, 1985; Gottlieb, 1985; Horwitz, 1984; Mangelsdorff, 1985; Schradle & Dougher, 1985) or the life event literature (Eysenck, 1988; Kessler, Price, & Wortman, 1985; Sanderman, Ormel, & Raats, 1986).

2.2.2 Focus of the Review of the Literature

The review of the literature addresses first the issue of the content of life events. A rationale is advanced for an expansion of the definition of life events to include life experiences and perceptions of the reality and exigency of life. In this

regard, the content items of the rich literature in existentialism and ontology are considered appropriate for inclusion in an inventory of life's contingencies. Secondly, the review of the literature examines the two critical issues in the scaling of the reality and exigency of life: 1) whether magnitude scaling is possible for a wide array of life events, experiences and perceptions; and, 2) whether the array is unidimensional or multidimensional in structure. An immediate test of the efficacy of magnitude and multidimensional scaling versus a linear and unidimensional model in predicting substance use is incorporated into the research design.

As noted in the literature review, the number of supporting and non-confirmatory studies across a diverse number of domains appear in near equal frequency. The common conclusion of inconsistent findings across the now substantial number of critical reviews of both the general stress and life event literature, points to the need for a new direction in research. While recognizing that other new directions are possible in tackling the impasse, this research asserts that the investigation of both magnitude and multidimensional scaling with respect to the topic area of life events is a relevant pursuit of enquiry. Further, these two components of scaling (together with the further issue of a typology of persons in terms of life's realities and exigencies) address a substantial number of serious problems arising in the literature to date. Moreover, the research provides an immediate critical test of the efficacy of this line of enquiry through a comparison of magnitude and multidimensional scaling to the linear unidimensional models currently used in the literature. In addition, the results of this part of the investigation can shed further light for future address of the other encumbrances

noted in the literature with respect to retrospective and other response biases as well as the other outstanding problems associated with the design of research in the life event area.

2.3 Problems Presented in the Literature

As noted earlier, the literature is replete with almost as many definitions of stress and life events as there have been researchers. The delineation of these two constructs is critically important in refined psychological measurement, which in Jackson's (1970) and Loevinger's (1957) view must be addressed at the onset of research. Stress is generally conceptualized as an altered state of a person induced by agents both within the person (biological and psychological) and external to the person (social, cultural, and physical environments). Cannon's (1939) and Selye's (1956, 1974) research on the General Adaptation Syndrome have contributed to the theoretical base for understanding the physiological adaptations to stress. However, this simple stimulus - response model, with its reliance on a unicasuality perspective, has proved inadequate (Lazarus & Monet, 1977); and other alternate models need to be considered (Kessler, Price, & Wortman, 1985). This research adopts the definition of stress used by Eysenck (1988) wherein stress is defined as that which is "imposed upon the material in question by the outer world" (p. 57). In psychological terms, stress is, for example, the loss of a spouse, a condition of isolation, physical pain, a social expectation to behave responsibly, or acquiring a mortgage.

Particularly absent in the general literature on life events is information on the major conditions of being human - death, loneliness, rejection, guilt, meaninglessness, and so forth - even though these dimensions have long been associated with philosophy as well as classical and popular literature. Linguistically, it is held that these conditions are often more continuous than discrete events and should be characterized conceptually as life experiences rather than single life events; albeit, some incidents may have had such impact that recollection (or an anticipation) of them assumes a denotative rather than connotive sense, and for this reason, this research adopts a more global terminology, descriptively labelled as "life realities and exigencies". As well, both inanimate objects and other constructs such as responsibility, freedom, or self worth, are characterized in terms of perceptual properties as compared to event features. The use of a more global terminology incorporates these distinctions more effectively. As such, this research expands the entities of research enquiry beyond the category of life events to include a wide range of life experiences and items of related perceptions about life.

An expansion of the definition of life events as it is engaged in the current literature has an adjunctive value - that is, the incorporation of much of the topical areas of existentialism and ontology which have, in the past, pursued these topics independently and somewhat in isolation of the research community. At present, the existential-ontological literature is still largely descriptive with little quantifiable data (Thauberger, Ruznisky, & Cleland, 1981). The conditions of being human, be they pleasant of unpleasant, are not new to those versed in classical literature or

philosophy. What is absent is quantified documentation of the implications of holding different views of the human condition (Ruznisky & Thauberger, 1982; Thauberger, Cleland, & Nicholson, 1982; Thauberger, Ruznisky & Cleland, 1981). Elsewhere (Thauberger, Vaselenak, & Pagliaro, 1989) have noted that the existential-ontological condition of being human is of central importance in addressing the monumental problem of addiction, particularly in light of the assumed role of life stresses in the causality of substance use and abuse. Considerable overlap appears in the literature between life events and the existential-ontological domain. Much in these two bodies of enquiry can be amalgamated. In this context, the testing of the efficacy of the scaling components of this research is provided an appropriate rationale for two reasons. Not only does substance use furnish a readily accessible behavior to serve as a dependent measure; but, the area of addiction (which is in particular need of knowledge about the relationship between life event stress and substance use) has already identified a critical hypothesis in need of experimental testing from the point of view of both magnitude and multidimensional scaling as well as a typology of persons.

More specifically, Greaves (1965) over 20 years ago has noted that reliance on a contrived conception of abstinence is the major cause of failure in substance rehabilitation programs, a position which has been echoed more recently by Louria (1975), and Girdano and Dusek (1980). The fact, as well, that other mammals have a characteristic inclination to take drugs, and like humans, quickly learn to self-administer many drugs supports the need for a new address and line of investigation. As throughout the general literature on life events, virtually exclusive

of the aspect examined, studies which have focused on the association of life events and substance use have produced only mixed results. In their critical review of the literature on life events and addiction, O'Doherty and Davies (1987) conclude that there may be a relationship between life events and the course of addiction; however, the overall picture is confused and often inconsistent, and no strong evidence links between events and behavior has emerged. Some effort has been devoted to distinguishing between controllable and uncontrollable stress, however, such studies (e.g., Newcomb & Harlow; 1986; Newcomb, Huba, & Bentler, 1986; Wright, Zautra, & Braver, 1985) have only produced mixed results as well. Unpublished data of the author, similarly, has not yielded substantial linkage between any of the items in the Incidents of Reality Scale and indices of various substance use ranging from the use of tobacco and alcohol to heroin.

A related second problem with the existing literature on life events is the failure to distinguish between the concepts of 'stress' and 'strain' as has been done, for example, in physics (Eysenck, 1975, 1988). In this sense, "the loss of a wife [for instance] is a stress; the psychological, hormonal, physiological and other consequences are the strain" (Eysenck, 1988, p. 57). From this perspective discriminating between stress and strain is important in that "identical stresses may set up quite different strains, depending on the individual" (Eysenck, 1988, p. 57). A scale such as the Holmes and Rahe (1967) Social Readjustment Rating Scale has not provided for delineating the distinction, for instance, between the death of a spouse as this relates to one who loves the spouse versus the one who does not. In the literature on life events, the idea of strain has received little attention

with respect to the specific magnitude of an individual's reaction or perception. The literature on life events has often relied on a cumulative frequency approach wherein the amount of strain is calculated as a function of the number of life events an individual has had to face within a given time period. A scattering of exceptions exist in the literature. For example, Rubio and Lubin (1985) found that expectedness, amount of pressure and adjustment required to cope with an event was a more effective prediction of important strain-producing aspects of life events than the actual number of life events. Similarly, Defares, Brandjes, Nass, and Van-der-Ploeg (1984) using a person-environment fit variable as strain predictors were able to distinguish gender differences in various defective health states. In addition, Ruznisky and Thauberger (1982) have approached the issue of life event stress somewhat differently in the development of the Incidents of Reality Scale (IRS) which in addition to yielding a hierarchical order among various existential-ontological stresses, engages the magnitude of strain through an open ended response format. At present, virtually no subsequent work has appeared in the literature using the IRS. This research re-examines this issue in terms of investigating whether a magnitude scaling of life realities and exigencies is possible; and then, compares the properties of magnitude as well as multidimensional scaling versus a linear model.

Related also to the definitional issue as well as the issue of magnitude and multidimensional versus linear scaling is a third problem embedded in the current literature - that is, the parsimony of the wide array of life events, experiences and perceptions. Operationally with respect to multidimensional versus unidimensional

scaling, the question (in practical terms) is whether the whole is more than the sum of its parts. Philosophically, this can be conceptualized as whether the reality and exigency of life is more than summation of specific considerations, perceptions and reactions, or whether the reality and exigency of life exerts a force beyond the discrete units accumulated into a collective definition. Experimentally, this distinction is important in that if the human experience is more than the sum of its parts, the corresponding research will require sufficient holistic information on the life event prior to any subsequent attempt to associate it with other variables. In other words, a comprehensive understanding of the effects of strain to a life event cannot be fully obtained through incremental study of the component parts of that life event. For example, the literature on substance use has been found to be notably unsuccessful in deciphering any clear line of relationship between life events (or life stress) and substance use behavior. In this topic area, the research, to date, has relied on incremental accumulation of unidimensional studies, and the lack of success in detecting a clear relationship is perhaps a function of the lack of study with holistic variables. While multidimensional investigation requires a much greater effort, the lack of success using a linear model beckons for research in a new direction. On the other hand it may be that no relationship exists between life events and addiction; however, as yet, this remains unknown. Alternatively, statistical experience has indicated in a general way in other areas of study, that an estimation of the holistic parameters from the sum of its parts (linear - unidimensional approaches) represents a reasonable fit of the data. The research is thus contributing to understanding this issue in terms of clarifying the

multidimensional versus unidimensional properties of life event strain. Considering the complexity of life events, and the lack of detection of any clear relationship to cognitions, affections, motivation or behaviors, it is possible that more than one line of dimension is needed to coalesce the plethora of life events, experiences, and perceptions. It is also possible that a particular selection of items is best represented in multidimensional structure while another selection of items is best reflected in unidimensional format, or alternatively a mixture of multidimensional and unidimensional configurations. A corollary to this question pertains to the issue that if the array of life events is multidimensional, do configurations of life events exist that are sensitive to magnitude scaling within independent dimensions. For example, Zimmerman (1983b) has concluded from his review of the literature that positive life events retain features that are of a different stress quality than negative life events. Other combinations are possible as well. As such, the research investigates simultaneously both the issue of multidimensional versus unidimensional representation of life events and the issue of magnitude versus linear scaling within different possible dimensions.

A fourth reason why the literature is unsatisfactory relates to the Events x Within Person condition wherein the reaction and/or perception of a person fluctuates across time. This variation is virtually unextractable from the data generated from questionnaires that have not obtained the person's individualistic reaction. Common experience readily illustrates that individuals often react differently to the same or similar situations for various reasons of novelty, simply trying it differently, or the need for more effective coping strategies. Such

distinctions are apt to elicit quite different physiological and other responses which need to be discerned before any subsequent formation of association can be meaningfully identified and interpreted. As well, individuals are apt to interpret a single term representing two or more events differently (for example, divorce) than if their evaluation is based on a single incident. The failure to distinguish between the discrete event and on-going life strain or long-lasting processes, which as Billings and Moos (1982) as well as Aro and Hanninen (1984) have pointed out, contributes to the difficulty in interpreting the relationship between events and functioning. In addition, the confounding of the measurement of discrete stressful events and ongoing life strain has been further identified by Billings and Moos (1982) as potentially underlying the consistency of events.

A fifth related concern with the literature on life events is the tendency to focus on negative events. Not only can positive events produce stress that can serve the interests of the individual (Selye, 1974, 1980), but such events potentially can produce distress reactions despite their pleasant qualities. As well, pleasurable events may produce stress that is inconsistent in its positive and negative properties. No known data exists which has differentiated situationally between these bipolar states to the same event. Even where positive life experiences have been examined, investigators have traditionally given them short shift in developing and testing models of mental health and psychopathology (Zautra & Reich, 1981). Although a smattering of experimental study involving manipulation of contingencies exists (Martin, Buckholt, Pipes, Nivens, & Katz, 1987) only mixed results have been reported. Some argument exists (Weinberger, Darnell, Martz,

Hiner, Neill, & Tierney, 1986) for separating positive and negative events in studies on life changes, and considerable more work is needed on the relationship of positive life events to illness (Cohen, McGowan, Fooskas, & Rose, 1984; Sarason, Sarason, Potter, & Antoni, 1985; Zimmerman, 1983a).

While recognizing the crucial need for documentation of the mapping of persons in terms of patterns of life events, experiences, and perceptions with respect to addressing one of the fundamental issues in the literature, this task is considered beyond the scope of the present investigation. Moreover, the construction of a typology of persons is best attempted subsequent to a determination of the mapping of the reality and exigency of life with respect to both magnitude and multidimensional structure. The value of such research, however, is further discussed in Chapter 6: "Limitations and Implications" of this dissertation.

A sixth problem with current studies in the life event literature pertains to the contaminating effects of retrospective bias. A succinct criticism of the traditional literature has been provided by Schroeder and Costa (1984) who note:

> There is good reason to suspect that the link between environmental stress and illness has been exaggerated in both the public mind and the psychological literature. Individuals are eager to find explanations for events that occurred to them, including reasons they experience ... and they may seize upon the stress hypothesis to account for what would otherwise have to be considered ill fortune. Unfortunately, many researchers have also come to suppose that illness is closely linked to life-stress, encouraged by retrospective self-report studies, which have often shown sizeable

> associations between recalled stress and recalled illness. But it could be argued that memory, perception and response tendencies figure so prominently in these studies that these factors alone could account for the findings (p. 833).

Although Maddi, Bartone, and Puccetti (1987) have provided a rebuttal to the Schroeder and Costa (1984) critique, it is reasonable to infer that many of the published studies are subject to the criticisms raised by Schroeder and Costa. In reviewing the stress literature, Eysenck (1988) has found much of the literature unsatisfactory because of the reliance in these studies on the notoriously unreliable method of retrospection. In Eysenck's (1988) view, "only prospective studies can give truly acceptable evidence of the importance of stress" (p. 57). While prospective studies provide a credible line of evidence across a longitudinal period, a requirement still remains within prospective research for the adequate measurement of stress and its strain. The research herein provides a more accurate measurement of the stress/strain dimension through investigating the efficacy of magnitude and multidimensional scaling of the realities and exigencies of being alive. In addition, subsequent research is thus equipped with additional information to further delineating the parameters of stress/strain in terms of life's contingencies both in prospective study and in the immediate investigation of the features and technicalities of life stress and life strain.

CHAPTER III

METHOD

3.1 Introduction

A crucial ingredient in the progress of a scientific discipline is the development of new methodologies (Kuhn, 1962, 1970; Popper, 1959, 1972). Within the social science perspective on stress, the methodology of measurement has been quite limited. Available research instruments have been restricted to predominantly the accumulative score type where participants respond to a series of content items with either a true or false endorsement. Alternatively, Likert type scales have also been used frequently, as have general response questions of an ad hoc nature. Although often of reasonable reliability, and some support of validity, such scales designed for the measurement of stress have not, however, produced a breakthrough in deciphering the complexities of stress, and in turn, relating such scores in a meaningful way to either the etiology or manifestation of symptoms in identifying associated conditions (such as disease, illness, personality, attitudes, or behavior) to a stress, either directly or indirectly. Though much information has been gleaned about stress, it is somewhat characteristic of social science research that once a topic has been addressed by a reasonable number of investigators, the balance of confirmatory and non-confirmatory studies tend to be about equal. Other disciplines such as physics and chemistry have had similar

histories and discernible progress has only been made with a shift in paradigm. For example, despite the fact that one-half of the experimental findings supported the 'concept of ether' as a medium of the photon, it was only when the 'concept of ether', not the facts learned, was abandoned did progress occur in the electromagnetic theory of light (Einstein & Infeld, 1938). The area of life event stress appears to be now at that crossroad.

3.2 Rationale

Central to an argument for a paradigm shift is the necessity to develop a new methodology. This aspect has been virtually ignored in the research on life event stress to date. While recognizing that other methodologies are possible in approaching the problems in the literature on life event stress, this research tests the efficacy of using the technique of multidimensional scaling as compared to the presently used linear model in investigating the area of life event stress. Multidimensional scaling is, of course, not new to social science research and a sizeable literature exists on its applications (Carroll, 1980; Davison, 1977, 1985; Guttman, 1966; Kruskal & Wish, 1978; Shepard, 1962; Torgerson, 1958; Young, 1984). Despite the extensive literature on multidimensional scaling, the technique has not been utilized in the measurement of life events. Within the context of life event stress, the application of multidimensional scaling is warranted as a preferred choice of methodology with which to best tackle the major instrument problems identified in the relevant literature. Essentially this research extends the work of Ruznisky and Thauberger (1982) on life events by developing a more

comprehensive life event inventory using multidimensional scaling techniques designed to produce a hierarchical scale of life conceptions, conditions, events, and objects which also reflect an order of magnitude (strain). With successful development of a multidimensional and magnitude scale(s), the second stage of the research tests the efficacy of a magnitude versus a linear model to the relationship between life event strain and the use of various substances from herbal tea to heroin. The choice of substance use as a dependent variable in the test of efficacy was made because of its behavioral property as compared to the less tangible variables of either attitudinal or affective states. Previous research (Zimmerman, 1983b) however, has found unweighted and weighted life event indices to be essentially equivalent (average correlation across 18 reviewed studies: $r = 0.94$) in predicting illness. In 16 of 19 studies examined by Zimmerman, weighted scores did not improve the stress-illness correlation. The weight assignment in the research cited by Zimmerman however, was determined through group-derived consensus weights, rather than through multidimensional scaling of test items as is investigated in this research.

For analogue purposes, the history of Richter magnitude scaling (Richter, 1935, 1958; Gutenberg & Richter, 1949, 1954) on earthquakes was reviewed. Although working with the more concrete phenomenon of shock waves as compared to the more conceptual notion of life event strain, the development of a magnitude scale for earthquakes has not been easy (Richter, 1935, 1958). For example, the precision of magnitudes was found to be impaired by a variety of conditions including: "the effects of inhomogeneity in the propagation of elastic

waves, of varying depths of focus, of differences in mechanism of shock production, of the ground at the several stations, and of the instrumental constants" (Richter, 1935, p. 3). These anomalies still require ongoing consideration within the discipline of seismology (Bath, 1979; Bolt, 1978; Committee on Seismology, 1969; Kasahara, 1981; Tazieff 1964). The development of a magnitude scale for life event strain is anticipated to encounter no fewer equivalent complexities.

3.3 Hypotheses

Since the design of this research is oriented to investigating both magnitude and multidimensional scaling in terms of the construction of a hierarchical scale pertinent to the realities and exigencies of life, the major hypotheses are experimental rather than statistical; in terms of testing the efficacy of a magnitude and multidimensional scaling in predicting substance use, two statistical hypotheses are applicable:

Hypothesis 1 (experimental): Magnitude scaling is a more viable reflection of the strain associated with the wide array of life events, experiences, and perceptions than linear scaling.

Hypothesis 2 (experimental): Multidimensional scaling will more adequately reflect the strain associated with a wide array of life events, experiences, and perceptions than linear scaling.

Hypothesis 3 (statistical): There is no difference between magnitude and linear models of life strain as to the prediction of substance use.

Hypothesis 4 (statistical): There is no difference between multidimensional and linear models of life strain as to the prediction of substance use.

3.4 Materials

The inventory of Life Events, Experiences and Perception is briefly described as follows: It consists of 270 items (see Appendix: Table A.1) pertaining to life events, experiences and human conditions which may, according to varying degrees of intensity, cause stress, fear, concern, or upset to a person. Participants are requested to evaluate each of 269 items for personal stress or concern against a reference point of an Appendectomy arbitrarily given a value of 500 units. The term 'stress' was used in preference to the term 'strain' because of its more common usage and understanding in common language. The choice of an Appendectomy as a reference point was based on its clarity of meaning (which in operational terms is reasonably understood) as well as its common occurrence for those with the experience, while for those without an appendectomy, the surgical operation can be readily imagined. The preference for a more concrete reference point was predicated on the difficulty which arises in the Holmes and Rahe (1967) Social Readjustment Rating Scale (SRRS) which uses Marriage as the point of reference. In this regard, Marriage has a serious non-experiential quality for those

without spouses as well as additional complexity embedded in whether one's feeling are settling or unsettling to this event. Moreover, cases of multiple marriage, the marriage of convenience, marriages where the spouse is living but from whom one is estranged, and marriages where the spouse is deceased contribute further ambiguity to the meaning of obtained data, or at least indicate the need for additional information for Subject x Factor comparisons (Ruznisky & Thauberger, 1982).

As compared to the SRRS, the scope of items is considerably expanded. While such issues as loneliness, meaningless, guilt, and rejection may be embedded in such SRRS items in "Marital Separation", "Fired at Work", or "Change In Social Activities", these items do not assess these existential-ontological dimensions directly. Secondly, the SRRS attempts to tap an individual's concern in terms of 'life change units' is distinct from actual 'strain units', and all of the SRRS items either directly refer to or imply change of one kind or another. The overlap of change with strain hinges on the meaning of these dimensions to individuals. There are many individuals who consistently advocate change, which suggests that some individuals may not interpret change as strain, or may be ambivalent, indifferent or in outright conflict as to the merits and demerits of advocating change. In the inventory used for this research, approximately one-half of the items refer to human conditions rather than change events as is the format of the SRRS scale. In addition, approximately ten percent of the provisional items pertain to experiences, while approximately another fifteen percent of the items reflect positive conceptions, experiences, events, or objects.

The number of unique categories used by individuals in completing the Inventory of Life Events, Experiences and Perceptions were calculated for each participant. Summary statistics of the number of unique categories were as follows: least number of categories = 6; most number of categories = 80; median = 17.0; mean = 19.24; standard deviation = 10.14. In general, the median number of cateogries were separated by 100 units; a few participants made use of a smaller unit, which was generally limited to 25 units; only the rare particpant made use of a value as small as one to five units.

The Inventory of Substance Use (Appendix: Table A.2) was comprised of 36 items ranging from tobacco to heroin. Both prescription and non-prescription compounds were included. Participants were requested to respond to each item according to ten choices. These choices ranged hierarchically from (1) Never, to (10) Several times a day. For scoring purposes, the number of the choice was the assigned value. In addition to the above, a brief biographical data sheet was included for the purposes of obtaining information about such routine characteristics as education, gender, age, and income. All questionnaires and data collection procedures have passed the Ethics Review Committee for research with human subjects (University of Alberta, Department of Psychology, 1986, and the Department of Educational Psychology, 1989).

3.5 Research Participants

In the sample were 104 males, 194 females, plus 6 individuals without recorded gender. Ages ranged between 16 and 81 years; median age was

approximately 27.0 years. These individuals were all volunteers (paid ten dollars) from professionals, non-professional, academic, and various social agencies in mid-western Canada. The specific demographic breakdowns of ten demographic categorizations are presented in Table 3.1.

Initially the sample of respondents was comprised of 396 individuals. Thirty-six of the protocols were eliminated because of excessive missing data. Following the cutoff criterion of a score of four with respect to pseudo-random responding (Jackson, 1967) a further 49 protocols were eliminated from the subsequent analysis based on responses to the Infrequency Scale of the Personality Research Form which is a measure of careless or non-purposeful responding, or poor language comprehension. A further seven protocols were eliminated because of missing values (cutoff > 13) in the life event, experiences and perceptions portion of the database which reduced the sample to 304.

3.6 Procedure

The Inventory of Life Events, Experiences, and Perceptions was administered to the sample with the following instructions. "Listed below are a number of things, life events, and human conditions which may, according to varying degrees of intensity, cause stress, fear, concern or upsetedness to a person. Please rate these items as to their relative degree of stress or concern to you personally. In rating these items consider the following mechanics of rating: Item 1. Appendectomy (surgical removal of the appendix) has been assigned an arbitrary value of 500. As you complete this list consider whether each event,

Table 3.1

Summary Characteristics of Ten Demographic Categorizations of Research Participants

Categorization	N		N
Age (in years):			
16 - 20	= 46	56 - 60	= 8
21 - 25	= 85	61 - 65	= 8
26 - 30	= 68	66 - 70	= 3
31 - 35	= 38	71 - 75	= 3
36 - 40	= 14	76 - 80	= 0
41 - 45	= 11	81 - 85	= 1
46 - 50	= 6	Unrecorded	= 6
51 - 55	= 7	Median	= 27.0
Gender:			
female	= 194		
male	= 104		
unrecorded	= 6		
Ethnic Origin:			
English Canadian	= 198	Metis	= 7
French Canadian	= 15	Other	= 53
Other Canadian	= 27	Unrecorded	= 4
Marital Status:			
Single	= 123	Separated	= 11
Married	= 154	Divorced	= 8
Widow(er)	= 4	Unrecorded	= 4

Educational Level:

Elementary Schools	= 12	Post University	= 100
Post Secondary	= 41	University Degree	= 52
Grade Twelve	= 52	Graduate Studies	= 12
Diploma	= 29	Unrecorded	= 6

Children:

None	= 159	Four-Five	= 16
One	= 42	Above Five	= 14
Two-Three	= 65	Unrecorded	= 9

Religious Affiliation:

Catholic	= 103	None	= 27
United	= 49	Agnostic	= 10
Anglican	= 19	Atheist	= 8
Presbyterian	= 2	Other	= 34
Mennonite	= 1	Unrecorded	= 5
Mormon	= 46		

Geographical Background:

Urban	= 201
Rural	= 98
Unrecorded	= 5

Occupation:

Professional	= 73	Clerical	= 31
Student	= 102	Other	= 52
Skilled Labourer	= 27	Unrecorded	= 3
Unskilled Labourer	= 16		

Income Level:

Less $1,000	= 42	$20,000 to $30,000	= 62
$1,000 to $10,000	= 107	Above $30,000	= 28
$10,000 to $20,000	= 58	Unrecorded	= 7

condition or thing is *more* or *less* stressful to you personally than an Appendectomy. If you decide the item is more intense, then choose a *proportionally larger* number and place it on the blank directly opposite in the column marked "VALUE". If you decide that the item is less stressful than an Appendectomy, then indicate how much less by placing a *proportionally smaller* number in the "VALUE" column. If the item is of equal intensity to an Appendectomy record the number 500 opposite the item. Please score these events, conditions and things according to your own personal reactions. Thank you for participating in this research".

For the substance and drug use items, the directions were simple and straight forward: "How often do you use the following:" Both inventories together with the biographical information sheet were administered in random order. Follow-up with various participants indicated no difficulty in understanding of the task required. All information was collected anonymously.

3.6.1 Response Bias Considerations

Of persistent concern to psychometric scale construction is the issue of response biases such as pseudo-random responding, social desirability, acquiescence, and other influences affecting the responder such as boredom and fatigue. The number of life events, experiences, and perceptions items that yielded significant correlations ($p \leq .01$) with existing scales of such factors are presented in Table 3.2.

Finally, each of the 269 life events, experiences and perceptions items were correlated with the variable of Untried items existing in the larger database of which this study was part. Herein, three items yielded significant correlations (Pearson)

of .16 while one item yielded a correlation of .25. In addition, several reaction items were included, the results of which are presented in Table 3.3 (see Appendix: Table A.5 for example of questionnaire format), which similarly indicates that participants were able to deal with the rating task in a straight-forward manner. This finding together with those listed in Table 3.2 and Table 3.3 indicate that the 269 item inventory of life events, experiences, and perceptions is not confounded with response biases. The number of items which overlap with these factors is within (except for social desirability) what would be expected by the frequency of chance correlations alone. Although a greater number of items overlap with social desirability, the overlap is minimal and reflects in the maximum case, less than ten percent overlap. Interpretation of these findings, however, should be made with the caveat that the correlations between the magnitude values (from the Inventory of Life Events, Experiences and Perceptions) and the score values from the response bias measures are a different quality than regular correlations between personality variables. More specifically, the response bias measures are self-referent values in terms of personality-type characteristics whereas the magnitude values reflect a stimulus judgment task. Similarly, the correlations between the magnitude values and the substance use scores (reported in Chapter IV of the dissertation) also reflect this different quality and should be considred with the same caveat. In addition, the Infrequency score represents a random or inattentive response and is thus a task specific indicator rather than a self-referent score and should be interpreted with this feature in mind.

Table 3.2

Summary Frequencies of Correlations Pertaining to Response Biases

Source			Number of Items*
Social Desirability (Jackson, 1967)	r = ± .15	=	4
	r = ± .18	=	1
	r = ± .21	=	4
	r = ± .22	=	1
	r = ± .23	=	3
	r = ± .24	=	3
	r = ± .26	=	1
	r = ± .31	=	1
	Total	=	18
Infrequency (Jackson, 1967)	r = ± .15	=	1
	r = ± .16	=	2
	Total	=	3
Acquiesence (Welsh, 1956)	r = ± .17	=	1
	Total	=	1
Satiation (Thauberger, 1974)	r = ± .15	=	1
	r = ± .16	=	1
	Total	=	2
Lie 1 (Eysenck & Eysenck, 1975)	r = ± .15	=	1
	Total	=	5
Lie 2 (Eysenck & Eysenck, 1976)	r = ± .16	=	3
	r = ± .17	=	2
	Total	=	5
Boredom Susceptibility (Zuckerman, 1979)	r (α)	=	0
	Total	=	0

Boredom 1 (Thauberger, 1989)	r = ± .15	=	1
	r = ± .16	=	2
	Total	=	3
Boredom 2 (Thauberger, 1989)	r = ± .16	=	2
	Total	=	2

* The α level (.01, two-tailed) for N = 304 is r = 0.148.

Table 3.3

Summary Correlation Frequencies Pertaining to Respondent Experiences

Source		Number of Items*
few topics	r = ± .18 =	2
bored/interested	r = ± .15 =	1
	r = ± .16 =	1
annoyed/not bothered by them	r (α) =	0
apathetic/curious	r (α) =	0
hostile/cooperative	r = ± .17 =	1
	r = ± .18 =	1
	r = ± .19 =	1
anxious/undisturbed by them	r (α) =	0
tired/alert	r (α) =	0
caution, guarded	r = ± .16 =	1
frank, candid, open	r = ± .18 =	1
	r = ± .20 =	1
	r = ± .22 =	2

* The α level (.01, two-tailed) for N = 304 is r = 0.148).

CHAPTER IV

RESULTS

4.1 Introduction

Standard statistical rules for large samples regarding the criterion for judging significance (α = .01 and .001, two tailed) are employed throughout the study. Decisions regarding the outcome of the analyses regarding magnitude and multidimensional scaling conformed to current practice in the field. Deviations from any procedure are accordingly justified.

The major question to be answered pertains to whether magnitude scaling is possible for the realities and exigencies of life. Data were open-ended response values. Although the reference point (An Appendectomy) is identical for all research participants, the estimation of its strain is assumed to vary among respondents. As such, item responses are compared in their raw form, in logarithmic (base 10) transformation as well as rescaled values where each score is first converted to a common metric (by subtracting the minimum value recorded by the participant, dividing each item for a particular research participant by the maximum value given by that individual to any item included in the inventory, then setting the range = $1\text{-}10^{12}$), and the logarithm (base 10) of the rescaled value. The rescaling conversion procedure produces a proximity or distance value for each item in terms of a metric common to all research participants (Kruskal & Wish, 1978). The data are analyzed in whole as well as through partition of items for scalability as to magnitude. Logarithmic and other transformations are explored

for determining the best fit of the data. This proximity is then used in the multidimensional scaling procedures using SPSS-X: Version 3 (SPSS, 1988). Though it is impossible to completely eliminate method variance from multidimensional scaling (MDS), the technique is sufficiently sensitive to determine if the major force in the data is one-dimensional. The MDS produced statistic of Stress in conjunction with R^2 is similar to the Eigenvalue criterion in Component Analysis (MacCallum, 1974) and is used in this research for decision making as well as subsequent interpretation of the data.

4.2 Findings Pertaining to Hypothesis 1

The intent of Hypothesis 1 was to explore the viability of magnitude scaling with respect to the strain reported for life events, experiences, and perceptions. Evaluation of the efficacy of this experimental hypothesis was thus predicated on the interrelationship with both multidimensional scaling and the prediction of substance use. As such, the major thrust of Hypothesis 1 was to determine whether an hierarchical order of life events, experiences and perceptions existed as well as whether substantial differences in magnitude judgments existed within specific stimuli. Table 4.1 presents the hierarchical order of 270 life events, experiences and perceptions arranged in descending group order of perceived magnitude according to the raw median values calculated for each stimuli. Also, included in the Table are the associated geometric means as well as the logarithmic (base 10) median and range of logarithmic magnitudes. Examination of Table 4.1 indicates extensive diversity in magnitude judgments (Range: logarithm medians from 1.699 to 3.000). As well, a substantial range of values

Table 4.1

A Magnitude Scale of the Realities & Exigencies of Life

		Median	Log	Log Range	Geometric Mean
1.	Terminal Illness	1,000	3.000	4.000	1425.00
2.	Death of Spouse or Mate	1,000	3.000	4.176	1664.00
3.	Death of My Father	1,000	3.000	8.176	1413.00
4.	Death of One's Child	1,000	3.000	4.000	1706.00
5.	Death of Brother or Sister	1,000	3.000	5.301	1328.00
6.	Death of My Mother	1,000	3.000	5.699	1595.00
7.	Major, Permanent Paralysis	1,000	3.000	6.000	1246.00
8.	Blindness	950	2.978	7.000	1183.00
9.	Major Heart Attack	900	2.954	6.301	1055.00
10.	Lung Cancer	900	2.954	6.000	1022.00
11.	Brain Tumour	900	2.954	6.000	1086.00
12.	Having Serious Brain Damage	900	2.954	6.000	973.30
13.	Deafness	900	2.954	6.000	1061.00

14.	Loss of a leg	900	2.954	7.000	1136.00
15.	A Nuclear War	900	2.954	7.000	1137.00
16.	Loss of an Arm	840	2.914	6.000	978.70
17.	Drowning	800	2.903	6.000	768.90
18.	Major Handicap	800	2.903	6.000	947.80
19.	My Own Death	800	2.903	9.000	524.10
20.	Child Abuse	800	2.903	4.602	957.30
21.	Confinement in Prison	800	2.903	7.000	866.90
22.	Loss of Personal Freedom	800	2.903	12.000	1070.00
23.	Divorce	800	2.903	6.000	821.90
24.	Leprosy	800	2.903	6.000	614.20
25.	Rape of a Female Known to You	800	2.903	6.000	791.80
26.	Psychiatric Illness (self)	800	2.903	6.000	751.20
27.	Sexual Molesting of a Child by a Family Member	800	2.903	6.000	988.80
28.	Sexual Molesting of a Child by a Stranger	800	2.903	6.000	837.60
29.	Stroke	800	2.903	5.000	843.50

30.	Need for Neurosurgery	800	2.903	5.699	909.40
31.	Major Stroke	800	2.903	6.000	978.40
32.	Minor, Permanent Paralysis	800	2.903	6.000	882.30
33.	Major, Temporary Paralysis	750	2.875	5.000	784.70
34.	A Volcanic Eruption on the Continent	750	2.860	5.000	550.10
35.	Serious Illness	700	2.845	2.954	734.40
36.	Rejection Shown Toward You from Loved One	700	2.845	3.875	628.80
37.	Rejection Shown Toward You from Your Mother	700	2.845	4.845	591.10
38.	Rejection by One's Child	700	2.845	4.699	672.60
39.	Kidney Failure	700	2.845	6.000	729.70
40.	Minor Heart Attack	700	2.845	6.000	703.30
41.	War with Another Country	700	2.845	7.000	559.60
42.	Psychiatric Illness (Family Member)	700	2.845	6.000	716.50
43.	Someone Sexually Molesting an Elderly Person	700	2.845	6.000	652.40
44.	A Major Earthquake Within 100 Miles of Here	700	2.845	6.000	556.30
45.	Rejection Shown Toward You from Your Father	700	2.829	4.845	533.30
46.	Shortage of Food for Family Members	700	2.829	5.097	592.50

47.	Disfiguration	600	2.778	4.699	592.70
48.	Serious Law Infraction	600	2.778	6.000	570.80
49.	Fired From Job	600	2.778	6.000	567.90
50.	Loss of Significant Income	600	2.778	6.000	602.70
51.	Mastectomy of a Female Family Member	600	2.778	5.000	565.60
52.	Major Depression	600	2.778	5.699	537.50
53.	Minor Stroke	600	2.778	4.699	628.80
54.	Situation of Physical Danger	600	2.778	4.699	542.80
55.	Being Without Money While Having More Debts	600	2.778	6.000	490.10
56.	Going on the Space Shuttle	600	2.778	4.301	347.80
57.	Use of Heroin	600	2.778	4.176	301.50
58.	Mortgage over $50,000.00	500	2.699	5.000	352.70
59.	Minor Handicap	500	2.699	3.903	397.90
60.	Isolation from Others	500	2.699	4.000	429.90
61.	Injustice (Done to You)	500	2.699	6.000	400.70
62.	Physical Pain	500	2.699	3.778	347.20
63.	Boredom with Spouse or Mate	500	2.699	4.778	315.40

64.	Boredom with Life	500	2.699	4.699	314.40
65.	Rejection Shown Toward You from Brothers and Sisters	500	2.699	4.699	387.30
66.	Suffering	500	2.699	6.000	467.90
67.	Strong Frustration	500	2.699	5.000	433.00
68.	Emotional Pain	500	2.699	4.699	497.10
69.	Winning a Big Lottery	500	2.699	6.000	283.80
70.	Psychiatric Illness (Acquaintance)	500	2.699	6.000	411.20
71.	Minor, Temporary Paralysis	500	2.699	5.000	538.70
72.	Situation Requiring Personal Courage	500	2.699	4.699	431.80
73.	Situation Requiring Moral Courage	500	2.699	4.699	371.20
74.	Shortage of Food for Self	500	2.699	5.000	437.80
75.	Testifying in Court on Major Crime	500	2.699	4.301	333.10
76.	Accused of Something You Didn't Do	500	2.699	4.000	382.20
77.	Being Jilted by a Loved Person	500	2.699	4.699	480.00
78.	Breaking Up with a Boyfriend or Girlfriend	500	2.699	4.699	455.00
79.	Being Sued	500	2.699	4.699	368.30

80.	Getting Married	500	2.699	6.000	386.80
81.	Epilepsy	500	2.699	5.000	340.10
82.	Seeing a Loved One Hungry	500	2.699	4.875	387.30
83.	Fungicide Poisoning with Significant Loss of Life	500	2.699	5.000	381.70
84.	Nuclear Reaction Problems	500	2.699	5.000	388.70
85.	Appendectomy	500	Reference Point		--
86.	Going for a Test for Serious Medical Problem	450	2.653	3.477	331.60
87.	Pursued by Attractive Member of Same Sex	450	2.653	6.000	268.10
88.	Condemnation of Oneself	450	2.628	4.699	325.60
89.	Injustice (Done to Others)	450	2.618	5.000	360.10
90.	Speaking on Television	425	2.653	3.778	317.80
91.	Loneliness	400	2.602	2.301	350.70
92.	Responsibility	400	2.602	6.000	303.20
93.	Seeing Another Person Being Rejected	400	2.602	4.000	275.80
94.	Emptiness (Feeling Empty)	400	2.602	4.845	340.60
95.	To Reject Oneself	400	2.602	4.699	256.20

96.	Outstanding Achievement (Self)	400	2.602	4.699	218.10
97.	Meeting One's Ideal Person	400	2.602	6.000	289.80
98.	Intense Joy	400	2.602	6.000	216.10
99.	Rape of a Female Unknown to You	400	2.602	6.000	295.70
100.	Truth That's Unpopular with Society	400	2.602	4.903	275.00
101.	Shortage of Food for Acquaintances	400	2.602	5.000	336.10
102.	Being a Lot Overweight	400	2.602	4.000	269.90
103.	Fighting with Serious Words with Another	400	2.602	3.477	334.90
104.	Admonishment from One's Work Supervisor	400	2.602	3.699	284.90
105.	The Coming of the Lord	400	2.602	11.000	187.00
106.	Speaking at a Conference	400	2.602	4.000	261.40
107.	Cruise Missile	400	2.602	5.000	192.10
108.	Burn Out (Own)	400	2.602	4.000	273.30
109.	Sky Diving	400	2.602	4.000	292.50
110.	Not Getting an Opportunity to Succeed in Social Circumstances	400	2.602	3.699	264.90
111.	Seeing a Loved One Sad	400	2.602	4.875	378.60

112.	Someone Abusing an Animal	400	2.602	5.000	330.20
113.	Major Earthquake with Significant Loss of Life	400	2.602	4.875	332.00
114.	Poisoning in Waste Disposal	400	2.602	4.699	316.90
115.	Glacier Avalanche with Significant Loss of Life	350	2.544	4.875	275.30
116.	Public Speaking	300	2.544	4.000	275.00
117.	Being Out in a Storm on a Lake	300	2.477	3.699	247.50
118.	Out in the Woods Alone	300	2.477	3.602	179.20
119.	Losing Control of One's Emotions	300	2.477	3.595	242.90
120.	Not Enough Sleep for More Than Two Days	300	2.477	3.301	218.20
121.	Sitting for an Important Exam	300	2.477	3.301	246.10
122.	Attending a Funeral	300	2.477	4.398	222.00
123.	Being Evaluated at One's Work	300	2.477	3.477	242.00
124.	Truth - Major Issue	300	2.477	6.000	224.40
125.	Being Too Fat	300	2.477	3.699	209.40
126.	Being Afraid	300	2.477	3.602	217.70
127.	Moving to Another City	300	2.477	4.000	204.50
128.	Being Overweight	300	2.477	5.000	221.40

129.	Use of Marijuana	300	2.477	4.000	155.20
130.	Meaninglessness	300	2.477	4.477	172.40
131.	Ridicule	300	2.477	5.053	221.50
132.	Guilt over Something Done	300	2.477	3.301	263.70
133.	Purposelessness	300	2.477	5.053	182.60
134.	Aloneness	300	2.477	4.699	253.20
135.	Anger	300	2.477	4.544	269.70
136.	Hostility	300	2.477	4.544	263.10
137.	Shame	300	2.477	4.301	244.20
138.	Receiving an Expensive Present from Someone You Don't want to Become Involved With	300	2.477	4.301	211.30
139.	Gravesite of Family Member	300	2.477	4.000	161.50
140.	Gravesite of Oneself	300	2.477	5.000	145.00
141.	Shortage of Food for Strangers	300	2.477	5.000	189.80
142.	Displays of Anger in Public	300	2.477	3.602	256.90
143.	Someone Yelling at You	300	2.477	3.477	266.80
144.	Yelling at Another Person	300	2.477	3.699	234.10

145.	Temptation for a Habit One is Trying to Break	300	2.477	3.301	208.20
146.	Making an Acceptance Speech for an Award	300	2.477	3.398	234.10
147.	Satan	300	2.477	9.000	132.40
148.	Someone Talking About Me "Behind My Back"	300	2.477	3.301	203.60
149.	Someone Trying to Make a Fool of Me	300	2.477	3.301	219.10
150.	Speaking on Radio	300	2.477	3.699	200.10
151.	Accused of Something You Did	300	2.477	4.000	228.10
152.	Someone Lying to You	300	2.477	3.699	277.50
153.	Obesity	275	2.438	4.000	150.40
154.	Condemnation of Another	250	2.398	3.398	195.80
155.	Guilt over Something Not Done	250	2.398	3.176	189.50
156.	Flooded Basement at Home	250	2.398	2.301	195.20
157.	The Black Death	250	2.398	4.875	143.80
158.	Someone Exaggerating Your Qualities in Public	200	2.349	3.398	179.40
159.	Snakes	200	2.301	3.176	106.10
160.	Aging	200	2.301	4.398	155.50
161.	Criticism	200	2.301	3.000	161.60

162.	Fate (That Things Happen as They do to Oneself)	200	2.301	3.724	126.10
163.	Fate (That Things Happen as They do to Others)	200	2.301	3.699	113.70
164.	Change	200	2.301	3.477	144.60
165.	Minor Law Infraction	200	2.301	3.000	132.40
166.	Retirement	200	2.301	3.699	131.10
167.	Height (High Altitudes)	200	2.301	3.398	136.60
168.	Fatigue	200	2.301	4.301	153.30
169.	Kindness Shown to You From a Family Member	200	2.301	6.000	111.40
170.	Kindness Shown to You From an Acquaintance You Like	200	2.301	6.000	100.60
171.	Kindness Shown to You From an Acquaintance You Dislike	200	2.301	3.398	136.80
172.	Receiving a Present From Another Who You Didn't Buy a Present For	200	2.301	3.114	143.30
173.	Receiving an Expensive Present From Someone You Like	200	2.301	4.176	120.90
174.	Seeing Someone Severely Drunk	200	2.301	6.000	138.00
175.	Tobacco Smoke	200	2.301	3.699	108.50
176.	Feeling Starved	200	2.301	6.000	152.10

177.	Telling a Fib to Someone	200	2.301	3.509	203.90
178.	Being Stopped by a Policeman	200	2.301	3.000	174.90
179.	Blind Date	200	2.301	3.477	155.70
180.	Being Approached for Money	200	2.301	3.000	133.20
181.	Speeding on a Freeway at 90 or More Miles per Hour	200	2.301	3.301	173.70
182.	Flying in a Small Aircraft	200	2.301	4.301	148.60
183.	Police Following your Car While Driving	200	2.301	3.000	133.70
184.	People Snickering at Me	200	2.301	3.000	171.10
185.	Pursued by Attractive Member of Opposite Sex	200	2.301	3.398	139.70
186.	Speaking Before Fellow Acquaintances	200	2.301	3.477	124.50
187.	Visiting a Psychiatrist	200	2.301	3.699	167.90
188.	Insomnia	200	2.301	3.301	133.50
189.	Truth - Minor issue	200	2.301	6.000	122.60
190.	Courage of One's Convictions	200	2.301	3.477	153.20
191.	Wishy-Washiness in Oneself	200	2.301	3.301	137.80
192.	Not Having Good Clothes	200	2.301	3.477	144.60

193.	Being Drunk	200	2.301	4.000	114.70
194.	Use of Tobacco	200	2.301	4.000	110.00
195.	Blocked Toilet in my Own Home	200	2.301	3.301	135.10
196.	World War II	200	2.301	4.875	154.50
197.	World War I	200	2.301	4.875	122.30
198.	Psychiatric Illness (Stranger)	150	2.301	4.699	94.63
199.	Wishy-Washiness in Others	150	2.301	3.176	107.60
200.	Continuous High Winds	150	2.176	3.845	102.80
201.	Doing an Intelligence Test	150	2.176	3.000	105.40
202.	Vomit	150	2.137	3.000	90.11
203.	Finding Ecstasy	100	2.176	4.000	84.52
204.	Kindness Shown to You From a Stranger	100	2.000	6.000	85.48
205.	Kissing Someone You Like in Public	100	2.000	6.000	84.91
206.	Someone You Like Kissing You in Public	100	2.000	4.000	82.71
207.	Being Kissed by Someone	100	2.000	6.000	76.64
208.	Death of a Stranger	100	2.000	3.477	70.00
209.	Insects	100	2.000	3.699	61.57

210.	Rejection Shown Toward You From a Stranger	100	2.000	3.000	87.32
211.	Sasquatch	100	2.000	3.322	24.52
212.	Big Foot	100	2.000	3.322	23.78
213.	Being on a Diet	100	2.000	3.301	65.84
214.	Sight of Mouth-Watering Food	100	2.000	3.000	63.21
215.	The Food Experience	100	2.000	3.000	48.63
216.	Speeding Above Posted Speed Limit	100	2.000	2.954	72.86
217.	Having a Joke Told on Oneself	100	2.000	3.000	83.50
218.	Having a Joke Told on Another	100	2.000	3.362	76.70
219.	Going to a Large Family Reunion	100	2.000	3.699	96.61
220.	Attending a Major Festival	100	2.000	3.699	66.59
221.	Falling off a Diet	100	2.000	3.176	66.33
222.	Alcohol	100	2.000	4.176	56.29
223.	Tobacco	100	2.000	4.176	62.68
224.	Dirty Diapers of Family Member	100	2.000	3.000	48.87
225.	Nausea	100	2.000	3.000	91.52
226.	Trying Foreign Food	100	2.000	3.000	55.50

227.	Expressing Affection to Loved One in Public	100	2.000	3.000	82.67
228.	Winning of a Game of Chance	100	2.000	3.301	76.96
229.	Cemetery	100	2.000	3.845	73.96
230.	Eating Alone	100	2.000	3.301	40.85
231.	Ghosts	100	2.000	3.301	33.51
232.	Dieting	100	2.000	3.301	51.73
233.	Being A Little Overweight	100	2.000	3.079	95.30
234.	Alien Creatures	100	2.000	3.477	46.15
235.	Bad Odour	100	2.000	3.176	91.27
236.	The Sweet Odour of Food	100	2.000	2.978	48.79
237.	Jogging	100	2.000	3.485	59.88
238.	Cold Weather	100	2.000	3.000	90.68
239.	Snow	100	2.000	4.000	59.05
240.	A Lengthy Rain	100	2.000	3.845	64.74
241.	Having to Make Something Creative	100	2.000	3.301	100.40
242.	Eating Alone in Public	100	2.000	3.000	55.55
243.	Driving Across a High Bridge	100	2.000	3.041	56.35

244.	Being Too Tired	100	2.000	3.000	100.80
245.	Flying in a Large Airplane	100	2.000	4.000	86.00
246.	Horseback Riding	100	2.000	3.000	52.40
247.	Catching a Big Fish	100	2.000	3.000	53.82
248.	Riding Horseback	100	2.000	3.000	49.90
249.	Waking up in the Morning by 7 O'Clock	100	2.000	2.903	51.13
250.	Power Outage at Home	100	2.000	2.903	70.16
251.	Visit a Medical Doctor	100	2.000	3.000	89.82
252.	Going on a Holiday	100	2.000	4.000	88.11
253.	Missing a Regular Meal	100	2.000	3.000	36.06
254.	Disciplining Oneself	100	2.000	3.000	89.42
255.	Acne	100	2.000	3.000	89.44
256.	Being Too Thin	100	2.000	3.000	61.93
257.	Going to Work	100	2.000	3.176	65.27
258.	Seeing a Loved One	100	2.000	5.000	63.63
259.	A Stranger Smiling at You	100	2.000	3.301	50.41
260.	Reading a Book in Psychology	100	2.000	3.301	36.88

261.	Reading a Book in Engineering	100	2.000	5.079	52.88
262.	Picking Potatoes for 3 Hours	100	2.000	3.602	71.84
263.	Use of Alcohol	100	2.088	4.000	98.63
264.	Use of Medication	100	2.000	3.079	57.78
265.	Sinking of the Titanic	100	2.000	4.328	83.91
266.	Full Moon	50	1.699	5.699	19.98
267.	Use of Aspirin	50	1.699	3.000	24.82
268.	Xeroxing 50 Pages	50	1.699	3.000	28.36
269.	Reading a Romance Novel	50	1.699	3.000	24.32
270.	Eating a Bowl of Strawberries	50	1.699	3.000	19.02

* The minimum log 10 value is 0.000 except for the following items: log 10 = 2 (serious illness, terminal illness, death of spouse or mate, death of one's child, death of my mother); log 10 = 1.845 (death of brother or sister); log 10 = 1.398 (child abuse); log 10 = 1.000 (loneliness, rejection shown to you from a loved one).

existed within stimuli with the range of logarithm values extending from a low of 0.0 to a high of 12.0, which is equivalent to a range of one trillion perceived strain units.

In summary, perceived strain associated with a wide diversity of life events, experiences and perceptions can be scaled along a single dimension with a full fit to the data. The value of such scaling is predicated, however, on its usefulness for subsequent understanding of the human condition as well as its predictive power.

4.3 Findings Pertaining to Hypothesis 2

The thrust of Hypothesis 2 was to explore the viability of multidimensional scaling with respect to the strain reported for life events, experiences, and perceptions. Numerous transformations of the data are possible. In view of the ratio property of magnitude responding, investigation of logarithmic transformations was of direct relevance. As well, in as much as people evaluate stimuli from an internal frame of reference, the conversion of participants scores to a common metric of evaluation warranted consideration. As such, four data versions were used as dependent measures to determine the best fit of the data as follows:

i. raw values of life events, experiences and perceptions

ii. logarithm (base 10) of raw values

iii. rescaled raw values to common metric: (((life event - minimum value)/maximum value) x $((10^{12}) -1)) + 1$

iv. logarithm (base 10) of rescaled values

In view of the limitation of applying logarithms to scores = 0, as well as the restriction of the Alscal and Proximities procedures of SPSS-X (Version 3) to non-missing values, two additional data modifications were performed:

1. all scores = 0 were recoded to score = 1 on the premise that this type of modification has the least effect on the overall item distribution (Schaeffer & Bradburn, 1989); and,
2. the participant's inventory mean was entered for each missing value on the basis that the individual participant's mean value was a more accurate reflection of the participant's true value than either the group mean or a substituted value estimated from an associated item. For instance, although a participant provided a value for "death of my father", this value may or may not be a reasonable estimate for "death of my mother". Similarly, given the open-ended response alternatives, the group mean for a particular item such as "death of my mother" potentially could be seriously out of line with the individual participant's true position. Out of a total of 81,776 values, 144 were missing which were distributed across 55 participants. Individual participant's mean values were substituted as follows: twelve items (1), nine (2), eight (1), seven (1), six (2), five (1), four (6), three (4), two (9) and one item (28).

Because of the further limitation of the Alscal program to a maximum of 100 variables, an additional procedural adjustment was necessitated pertaining to the selection of stimuli from the inventory of 269 items. In this regard, a random permutation of 90 sets of three numbers were generated with each block of six

sets of three numbers also randomized to avoid sequence duplication. Three groups of stimuli items (Group A = 90 items, Group B = 89 items, and Group C = 90 items) were selected according to the permutation distribution. As a further control for balancing, the order of item selection followed the sequence of inventory items arranged in descending order of median raw score values. A listing of the first ten entries for each of Groups A, B, C is presented in Table 4.2 for illustrative purposes. Examination of Table 4.2 indicates a reasonable semantic similarity across each of the groups of items.

The set of Group A items was chosen arbitrarily for exploration to determine the best fit of the data across each of the four types of data versions listed earlier. Because Euclidean distance is considered to "correspond to everyday experience" (Schiffman, Reynolds, & Young, 1981, p. 16), this proximities calculation was chosen in light of the semantic features of the stimuli under study. In addition, the choice of an Euclidean model is straight-forward in that the algebra of the Euclidean distance formula corresponds to the geometry of the Pythagorean theorem (Schiffman, Reynolds, & Young, 1981). Thus, the distance between two items, x and y, is the square root of the sum of the squared differences between the values for the items.

As well, the Euclidean model is applicable to single matrices, ratio level of measurement, metric and symmetrical shape of the matrix as well as makes provision for a scaling solution of only one dimension (SPSS, 1988). Not only is

Table 4.2

List of 10 Stimulus Items for Item Groups A, B, C and Composite Item Group D for Multidimensional Scaling Trials

Group A	Group B	Group C	Group D (Composite)
Death of my father	Terminal illness	Death of spouse or mate	Death of spouse or mate
Death of one's child	Death of brother or sister	Death of mother	Death of one's child
Major, permanent paralysis	Drowning	Blindness	Major, permanent paralysis
Lung cancer	Major heart attack	Brain tumour	Major heart attack
Loss of leg	Deafness	Having serious brain damage	Having serious brain damage
Loss of an arm	Major handicap	A nuclear war	Major handicap
Child abuse	Confinement in prison	My own death	My own death
Leprosy	Loss of personal freedom	Divorce	Leprosy
Rape of female known to you	Sexual molesting of a child by a family member	Psychiatric illness (self)	Sexual molesting of a child by a family member
Stroke	Sexual molesting of a child by a stranger	Need for neurosurgery	Need for neurosurgery

the provision for a one-dimensional model important to the determination of the best fit of the data, but the one-dimensional model may provide the best interpretative model. In comparison to other conjunctive, disjunctive, and linear compensatory models, for example, the perfect Guttman scale is a one-dimensional position model (Van der Ven, 1980). In the one-dimensional version of the position model only the relative distance, not the position of the points, is relevant, and the 'higher than' relation between points of other models "coincides with the 'larger than' relation" (Van der Ven, 1980, p.205). In the case of this investigation, the one-dimensional solution yielded the best fit of the data.

More specifically, Table 4.3 presents the results of the multidimensional scaling solutions derived on each of the four data versions. Examination of Table 4.3 indicates that none of the multidimensional scaling solutions associated with logarithm (base 10) raw values, rescaled to a common metric value, or logarithm (base 10) rescaled values are close in terms of best fit to the multidimensional scaling solution for the raw stimuli values. Considerable disparity is noted in Table 4.4 among the data versions, which illustrates the choice of several options for subsequent analyses. A selection of the most appropriate option would necessitate evaluation according to rational considerations.

Accordingly, each of the other two sets of stimuli (Groups B,C) were submitted to multidimensional scaling analysis using the raw data directly. In view of the randomized balancing procedure noted earlier, the analyses reflects a Split One-Thirds Replication Design. Because of the non-overlap in stimuli items, a fourth multidimensional scaling solution was determined for a composite (Group

Table 4.3

Summary Stress, S-Stress and RSQ Values
for Multidimensional Scaling Solutions Across Four Data Versions

Source	Dimensions	Stress	RSQ[a]	S - Stress[b]
Raw	1	0.002	1.000	0.000 (1)
Log 10 Raw	1	0.405	0.[illegible]1	0.412 (3)
	2	0.266	0.817	0.285 (5)
	3	0.199	0.861	0.231 (5)
	4	0.160	0.885	0.197 (5)
	5	0.137	0.902	0.171 (5)
	6	0.120	0.915	0.152 (5)
Rescaled	1	0.380	0.842	0.335 (3)
	2	0.253	0.873	0.232 (5)
	3	0.191	0.902	0.187 (5)
	4	0.155	0.919	0.158 (5)
	5	0.130	0.935	0.137 (4)
	6	0.113	0.946	0.122 (4)
Log 10 Rescaled	1	0.500	0.639	0.494 (3)
	2	0.324	0.775	0.355 (5)
	3	0.246	0.839	0.289 (5)
	4	0.196	0.876	0.247 (5)
	5	0.168	0.895	0.216 (5)
	6	0.148	0.910	0.193 (5)

[a] RSQ Values are the proportion of variance of the scaled data (disparities) in the partition (raw, matrix, or entire data) which is accounted for by their corresponding distances. Stress values are Krushal's Stress Formula 1 values.

[b] S - Stress values in squared distances are Young's S - Stress Formula 1 values. The number of iterations for improvement at 0.001 are given in parentheses.

Table 4.4

Intercorrelation Matrix of Data Transformations
(N = 304)

Source	Data Version			
	Raw	Log Raw	Rescaled	Log Scaled
Log Raw	.013			
Rescaled	-.099	.372*		
Log Rescaled	-.260*	.456*	.591*	
MDS	-.995**	-.008	.090	.241*

* p = .01, two tailed

** p = .001, two tailed; the multidimensional values were reconstituted by multiplying specific items with the MDS stimulus coordinate values. As such, a correlation slightly less than 1.00 is anticipated because of rounding error.

D) of 90 items comprised of three sets of 30 items randomly selected from across each of the Groups A,B,C distribution of items. Each of these Groups of items (B,C,D) also yielded a multidimensional scaling solution of one-dimension with RSQ=1.00 (Group B: S-Stress = 0.000 in one iteration, Stress = 0.000; Group C: S-Stress =0.143 in three iterations, Stress = 0.059; Group D: S-Stress = 0.000 in one iteration, Stress = 0.012) indicating full replication at an RSQ = 1.00 fit of the data. This is somewhat surprising in light of the considerable heterogeneity of the stimuli.

Examination of the stimulus coordinate weights (Appendix: Table A.4) for each of the Groups A, B, C, and D distribution of items indicates considerable similarity of values. All of the stimulus coordinate weights within each separate Group A, B and D are identical except for one value; although more disparity existed for Group C, considerable similarity still prevails with 90 items represented in the values. This similarity of stimulus coordinate weights reveals little differentiation between items and thus indicates that the inventory of the events, experiences and perceptions reflects a magnitude scale which is essentially the initial scale itself. Pearson intercorrelations were calculated among the three sets of stimuli items (Groups A,B,C) all of which were virtually zero (A:B = -0.003; A:C = -0.005; B:C = -0.005; N = 304). The absence of an association among item sets despite their parallel dimensions signals an interesting property of magnitude judgments of life's realities and exigencies, notably that substantial individuality exists in terms of specificity of stimuli which a person considers strain producing.

Since the plotting of stimuli is limited to 35 variables in Alscal, as well as the finding of a one-dimensional solution, no spatial mapping was engaged.

In summary of the above findings, multidimensional scaling was demonstrated to be of considerable assistance in reflecting the strain perceived to be associated with life events, experiences and perceptions. In particular, the finding of a one-dimensional configuration at an RSQ = 1.00 fit of the data, despite the extensive heterogeneity of stimuli, is exceptional in the scaling literature. Moreover, the replication of this finding through three sets of parallel items is noteworthy as is the finding of zero intercorrelations among three sets of stimuli. Consequently, the findings are considered to confirm the experimental prediction of Hypotheses 2.

4.4 Findings Pertaining to Hypothesis 3

The null Hypothesis 3 indicated that no difference should exist between magnitude versus an ordinary linear model in the prediction of substance use. Table 4.5 presents the number of statistically significant correlations ($p = .01$ and $p = .001$, two-tailed) generated from 36 substances (Appendix: Table A.3) across the raw values (linear model), logarithm (base 10) raw values, rescaled values, and logarithm (base 10) rescaled values. The means and standard deviations as well as the number of cases used in computing the correlation with the life event, experiences and perception items of these substances are presented in Appendix: Table A.3. Examination of Table 4.5 indicates that the logarithmic transformation yielded over three times as many statistically significant correlations than the

Table 4.5
Summary Frequencies of Correlation Generation for Four Data Versions

Substance	Raw			Log Raw			Rescaled			Log Rescaled		
	.01	.001	I	.01	.001	I	.01	.001	I	.01	.001	I
Alcohol	3	2	5	20	10	30	3	4	7	17	5	22
Tobacco	1	-	1	1	-	1	3	-	3	1	2	3
Tea (herbal)	-	-	0	3	8	11	4	5	9	2	6	8
Tea (caffeinated)	11	-	11	31	9	40	10	-	10	17	5	22
Coffee	6	-	6	33	15	48	16	-	16	32	4	36
Coffee (decaffeinated)	5	1	6	27	6	33	44	13	57	12	1	13
Junk food	3	-	3	7	1	8	1	-	1	5	1	6
Chocolate	-	-	0	-	-	0	-	-	0	-	-	0
Health foods	4	-	4	5	2	7	-	-	0	-	-	0
Amphetamines*	7	13	20	4	1	5	22	35	57	3	2	5
Sleep medication	3	-	3	4	-	4	38	20	58	4	-	4
Marijuana	5	4	9	7	2	9	-	1	1	1	-	1
Hashish	4	6	10	20	5	25	4	-	4	4	-	4
Antidepressants	2	-	2	4	-	4	57	44	101	2	-	2
Tranquilizers*	15	1	16	4	-	4	22	50	72	-	1	1*
Vitamins	1	-	1	1	1	2	-	-	0	-	1	1
Mineral supplements	2	-	2	2	-	2	-	-	0	-	2	2
PCP	4	2	6	12	18	30	-	-	0	9	12	21
Special supplements	-	-	0	10	-	10	-	-	0	-	-	0
Peyote	1	2	3	-	-	0	-	-	0	1	-	1
LSD	2	-	2	3	-	3	-	-	0	1	1	2
Morphine*	6	7	13	-	-	0	3	1	4	-	-	0*

Substance	Raw			Log Raw			Rescaled			Log Rescaled		
	.01	.001	T	.01	.001	T	.01	.001	T	.01	.001	T
Cocaine	-	1	1	26	13	39	1	-	1	8	4	12
Mescaline	-	2	2	-	-	0	-	-	0	1	-	1
Heroin	-	-	0	3	2	5	-	-	0	-	2	2
Psychiatric	-	1	1	16	7	23	5	4	9	4	4	8
Aspirin	1	-	1	6	-	6	11	-	11	8	2	10
Codeine	6	2	8	45	24	68	6	-	6	5	4	9
Pain killer	1	2	3	10	5	15	-	-	0	1	-	1
Sniff solvent	-	-	0	1	-	1	1	-	1	1	-	1
Elixir	1	-	1	-	-	0	-	-	0	-	-	0
Laxative	5	4	9	34	14	48	12	1	13	-	-	0
Antihistamines	-	1	1	2	-	2	5	-	5	1	-	1
Antibiotic	4	1	5	15	-	15	14	2	16	2	-	2
Nasal	-	-	0	1	-	1	2	-	2	-	-	0
Cough	3	-	3	7	-	7	13	2	15	8	3	11
Total	106	52	158	364	143	507	297	182	479	150	62	212

* Items with at least a threefold decrease in the total number of correlations generated as a result of logarithmic (base 10) transformation of raw values as compared to the number of correlations generated for the raw value condition. The degrees of freedom associated with each substance are located in Appendix: Table A.3.

ordinary linear model. Similarly, rescaling the raw values to a common metric increased the number of statistically significant correlations threefold as compared to the ordinary linear calculation.

The frequencies of the correlations generated by the four data versions were tested pairwise (using the Chi Square procedure for correlated proportions) against the equal expectation hypothesis, namely, that there was no real difference among any of the distributions. Both the logarithmic transformation of raw values and the rescaling to a common metric conditions yielded statistically significant differences as compared to the raw value condition (X^2 = 62.08 and 54.06, df = 1, $p \leq .01$ respectively) as well as when compared to the logarithm of the rescaled values (X^2 = 25.11 and 21.62, df = 1, $p \leq .01$ respectively). Although the number of statistically significant correlations generated by the logarithmic transformation of the rescaled values was larger than the linear generation, the number so generated is considerably less than either of the logarithm raw value or rescaled to a common metric conditions and is not statistically significant. A comparison of individual substances reveals some specificity in correlation generation. Generation of at least a threefold increase in favour of logarithmic calculations was noted for the following substances: alcohol, tea and coffee (both caffeinated and decaffeinated), hashish, junk food, PCP (angeldust), special supplements, cocaine, psychiatric medication, codeine, cocaine, pain killers, laxatives, antibiotics, and aspirin use. Contrarily, at least a threefold difference in favour of a linear model was noted for amphetamine, tranquillizer and morphine use. Why this would be is unexplainable at the present time.

Although, the magnitude transformation of values yielded over a threefold increase in total number of statistically significant correlations, the increase was not consistent across all substances. As such, magnitude scaling contributes to understanding substance use, however, it is not a sufficient method. Further research is necessary to delineate which substances are best understood by magnitude versus linear models. The significant increase in correlation generation, however, is sufficient to reject the null Hypothesis 3.

4.5 Findings Pertaining to Hypothesis 4

Similar to Hypothesis 3, the null Hypothesis 4 indicated that no difference should exist between multidimensional versus a linear model in the prediction of substance use. In light, however, of the one-dimensional solution obtained by the multidimensional scaling procedure, transformation of the raw stimuli value by an additive constant is redundant (see Appendix: Table A.4). As such, stimulus weights from the multidimensional scaling solution were applied to the raw stimuli value which, as expected, did not generate any additional statistically significant correlations. This procedure yielded a coefficient of reproducibility of the original raw stimuli value of $r = 0.9949$ which is within the limits of rounding error. Because of the absence of subject weights in a one-dimensional solution, the testing of Hypothesis 4 was limited to a comparison of total score (all life stimuli) with substance use. Table 4.6 presents the summary results of these analyses.

As anticipated, because of the one dimensional solution, the multidimensional scaling procedure and raw linear correlations are equivalent

Table 4.6
Frequency of Statistically Significant Correlations
Generated Across 36 Substances

Procedure*	Correlation Frequency P = .01	P = .001	Total	r = ≥ 0.10
Raw	-	-	-	1
Log 10 Raw	5	1	6	11
Rescaled	2	-	2	7
Log 10 Rescaled	-	-	-	1
Multidimensional	-	-	-	-

* Calculations are based on total life event values (all stimuli). In light of the one-dimensional solution obtained from the multidimensional scaling, the raw and multidimensional values are equivalent within rounding error. The degrees of freedom associated with each substance are located in Appendix: Table A.3.

(within rounding error). Similar to the correlations generated for the testing of Hypothesis 3, the logarithm (base 10) of raw values yielded the largest rate of return, followed relatively closely by the rescaling to a common metric conversion. Because of the equivalency of the multidimensional and raw value correlational procedures in the one-dimensional condition, only the frequencies of the correlations generated by the four data versions used earlier were tested against the equal expectation hypothesis. As well, only the overall association was tested because of the low expected frequencies in df=1 comparisons. Herein an overall statistically significant relationship was found (Chi Square: $X^2 = 8.375$ with correction for continuity, df=3, $p \leq .05$) across the total number of correlations generated. A similar finding resulted from a testing of the number of correlations generated at the $p \leq .10$ level ($X^2 = 14.40$, df=3, $p \leq .01$).

In summary, the finding of a one-dimensional solution through the multidimensional scaling procedure obviated a testing of a multidimensional versus a linear model in the prediction of substance use. Although the findings pertaining to this particular analysis add support to the predictions of Hypothesis 1 and 3, in light of the other findings in this investigation related to the properties of the stimuli scaling, the meaning of a total score of magnitude judgments is unclear at present, and considerable more work is necessary to determine the significance of larger versus smaller allocations of perceived strain to life event stimuli.

CHAPTER V

DISCUSSION AND INTERPRETATION OF RESULTS

5.1 General Statement of Findings

The results outlined in Chapter Four have demonstrated that magnitude scaling of perceived strain associated with a wide diversity of life events, experiences, and perceptions is a viable reflection of the stimuli. As compared to the ad hoc representation typically associated with linear models, this hierarchical order provides one framework to the mapping of this field. These results further indicated that strain pertaining to the realities and exigencies of life was perceived in a one-dimensional direction, with unusually high consistency across three different and one composite set of diverse stimuli. An unusual property of orthogonality across sets of stimuli was discovered, and interpreted as reflecting the specificity of stimuli as well as uniqueness of individual response, which preserves the feature of individuality in response pattern. As predicted, magnitude scaling was demonstrated to be considerably more efficacious in the uncovering of relationships with substance use than a linear model. The unexpected finding of a one-dimensional solution at a RSQ = 1.00 fit of the data, replicated across two additional and one composite sets of stimuli, obviated the usefulness of multidimensional scaling in the prediction of substance use as compared to the linear model of raw score calculations. Despite this redundancy for the prediction of substance use, the use of a multidimensional scaling solution was of

considerable assistance in comparing the best fit of the data according to four distinct types of data versions. The clear delineation of the raw score solution preserves parsimony in both the understanding and level of analyses required, which is important (at a certain level) to further progress in the topic area. Lastly, the finding of a one-dimensional position with respect to the strain associated with life events, experiences and perceptions has important clinical implications to the therapeutic intervention of strain associated with diverse realities and exigencies of life.

5.2 Specific Findings

The specific findings of this study pertain to the following issues: (1) the viability of magnitude and multidimensional scaling of perceived strain associated with life events, experiences, and perceptions; (2) the utility of magnitude and multidimensional scaling in the prediction of substance use.

5.2.1 Viability of Magnitude and Multidimensional Scaling

The viability of magnitude scaling was supported through the construction of a one-dimensional hierarchical ordering of an extensive array of 270 heterogeneous stimuli. The range of associated values across stimuli as well as within a specific stimulus are sufficiently expansive to preserve the appropriations of individual responses such as that implied in Cohen's (1971) verse "your pain is no credential here, it is just a shadow of my wound". From a clinical point of view the approaches to the issue of strain, as revealed in the literature review section

of this dissertation, have been diverse (among others, Eysenck, 1988; Lazarus, 1971, 1975, 1979; Nathan, Staats, & Rosch, 1987; Rudinger, 1988; Selye, 1956, 1974). At best, results have been mixed. Contrary to a plethora of intervention approaches to stresses and their associated strains, the results of this research indicate a greater need for parsimony. The fact that heterogeneous stimuli about life's realities and exigencies are perceived in a one-dimensional configuration, not only argues in favour of condensation of the diversity of approaches in general, but also argues in favour of an interpretation that condenses both positive and negative contingencies. While it is likely the case that positive life events retain features that are of a different stress quality than negative life events, as Zimmerman (1983a) has asserted, the results of this study indicate that positive life events are perceived within the same one-dimensional direction. This is an important underpinning in that strain from positive events (Selye, 1974, 1980; Tanner, 1976) is perceived by individuals to be within the same semantic domain as that associated with negative incidents. The argument for separating positive and negative events (Weinberger, Parnell, Martz, Hiner, Neill, & Tierney, 1986) as well as that for separately delineating the relationship of positive life events for illness (Cohen, McGowan, Fooskas, & Rose, 1985; Rubio & Lubin, 1986; Sarason, Puffer, & Antoni, 1985; Zimmerman, 1983a) may prove to be superfluous. In this investigation, approximately 15 positive life events were contained within each of the three sets of parallel items, which as noted earlier were still adjudicated to be within the one-dimensional direction of perceived strain.

The viability of multidimensional scaling was further demonstrated in this study through its utility in assessing the best fit to the data across four distinct types of data versions. This best fit, derived on raw value scores, is an important contribution to understanding the semantic map of the widely diverse heterogeneous stimuli. Moreover, the procedure of multidimensional scaling proved to be especially useful in demonstrating consistency across different sets of life event stimuli. This property associated with magnitude judgments of life events, experiences and perceptions is important to clarifying the semantic plane of a collection of stimuli that, on first glance, appears to be even too heterogeneous for scaling consistency. Moreover, the inclusion of various items from the literature collectively and identified as existentialism (which were found to be within the same plane of semantic strain) is important in that individuals apparently do not perceive the existential issues to be neither connotatively nor denotatively outside the same strain domain of other life events and situations.

Consistent with previous research on the ordering of life event stimuli (Holmes & Rahe, 1967; Ruznisky & Thauberger, 1982), the death of immediate family members was perceived as the most strainful issue for the average participant. Serious medical conditions as well as other traumatic events and experiences were also judged to be major strain producers. Contrary to the premise permeating the philosophical literature on death (see Thauberger, 1974) that one's own death is the most significant of all life issues, the average person judged at least 17 other situations above the stimulus "My Own Death". Moreover, insofar as this finding was determined on a categorization of a median indice, one

half of the sample judged their own death at or below this median value. In comparison, events or experiences involving strangers were not perceived as major strain producers; for example, the stimulus "Death of a Stranger" was rated at only the 100 strain unit level, something equivalent to "Horseback Riding", "Snow", or "Trying a Foreign Food".

In terms of the traditional existential-ontological entities (such as rejection, meaninglessness, loneliness, fate, guilt and so forth), in general these particular stimuli were rated at the same level as An Appendectomy, or below this Reference Point. One exception was the issue of rejection wherein several stimuli items were rated at median values of 700 strain units. As with the issue of one's own death, the stimulus "To Reject Oneself" (median = 400 units) was judged, on the average, to be considerably less strain producing than experiencing rejection from significant others. With respect to positive events or experiences, the highest rating ("Winning A Big Lottery") was rated at the same level as the reference point: An Appendectomy.

A last observation noted here pertains to the relevance of 'change' insofar as the issue of change mediates all items of the Holmes and Rahe (1967) Social Readjustment Rating Scale. With respect to this investigation, the direct stimulus "Change" was rated at 200 strain units which was well below the Reference Point of an Appendectomy. As such, at least 157 other stimuli were perceived as more strain producing than 'change' per se. Notwithstanding this distinctiveness in the relevance of the issue of change between the two inventories, the stimulus "Getting Married" used in this study (as compared to the reference point 'Marriage' in the

Holmes & Rahe scale) was rated at approximately the same level as An Appendectomy.

Taken as a whole, the results of this investigation demonstrate an unusual consistency across a very wide array of heterogeneous stimuli. Results of previous research by the author and his associates (Ruznisky & Thauberger, 1982) indicate a high degree of rank order reliability within the life event stimuli as well as compared to life change events (Holmes & Rahe, 1967). These findings are consistent with the demonstrated stability of ratio judgments in terms of sensory perception documented by S.S. Stevens (1975), among others. The uncovering of what appears to be a one-dimensional ratio model of strain pertaining to a large array of diverse stimuli regarding life's realities and exigencies argues for both a new methodology as well as a paradigm shift in the investigation of life events, experiences and perceptions as well as in the investigation of the general human stress and strain content domain. Considering the extensive heterogeneity of stimuli, a one-dimensional model is distinctive. The invitation of Feyerabend (1975) that the most successful scientific inquiries have never proceeded according to the rational method at all, appears peculiarly relevant to the discovery of several unusual properties to the scaling of life's realities and exigencies. While more work is required in the investigation of these psychometric properties, the high consistency of these properties is encouraging.

5.2.2 Utility of Magnitude and Multidimensional Scaling

Measurement of the utility of magnitude and multidimensional scaling was based primarily on the generation of statistically significant correlations calculated across 36 substances. In view of the one-dimensional solution obtained through the multidimensional scaling procedure, a comparison of the efficacy of this procedure to the regular linear model of raw values was superfluous, since in the unidimensional condition, both procedures are essentially equivalent. The utility of magnitude scaling was, however, demonstrated to be superior to the linear model, producing more than a threefold increase in the number of statistically significant correlations. Similarly, rescaling values to a common metric was nearly as potent for the generation of statistically significant correlations. The superiority of the logarithmic (base 10) transformation also held for the analyses involving total life event scores and the substance use variables. Again, rescaling to a common metric yielded the second largest number of statistically significant correlations.

Although not focused on in this particular study, the delineation of the relationship of life event strain with respect to substance use was enhanced through the use of multidimensional scaling in determining whether an inherent structure was underlying within the data. With respect to this particular investigation, the over threefold augmentation in the number of statistically significant correlations associated with magnitude scaling is encouraging to subsequent research on substance use, even though these correlations are still minimal and account generally for only 2 to 9 percent of the variance. On the other hand, both logarithmic transformations yielded a weaker fit for the data than either

the raw value score or rescaling of values to a common metric. Further research into the structure of substance use is warranted. Comparisons across data transformations may be of particular use in determining the convergent and discriminant features of substance use behavior. Progress in the delineation of substance use behavior can benefit from an understanding of both sides of a bipolarity of what substance use behavior is, in conjunction with an understanding of what substance use behavior is not.

The multidimensional scaling procedure was particularly useful as a methodological tool in line with the expressed twofold aim of multidimensional scaling (Fenton & Pearce, 1988), which was to reduce the data to improve manageability and meaningfulness, while at the same time identifying whether an inherent structure was underlying within the data. In this regard, the identification of a one-dimensional structure within the large array of diverse stimuli represented an important contribution to understanding the life event content domain. In addition, although the Euclidean model using raw value scores provided the best fit of the data, the use of the multidimensional procedure was able to furnish a basis of comparison of other data versions such as rescaling to a common metric as well as logarithmic transformations of both the rescaled and raw value scores. On the basis of the findings in this particular investigation, the use of multidimensional procedures in other investigations can be invaluable.

A final issue examined within this dissertation pertains to contamination of the item structure by artifacts such as yea-saying and other response biases in self ratings, which may be embedded in person means or in the general component.

Although the argument is controversial (Davison, 1985) the removal of such artifacts prior to other types of analyses may be fruitful. However, insofar as multidimensional scaling solutions are often similar to those obtained by removing person means or the general component (Davison, 1985), the significance of person means or the general component to multidimensional scaling is germane. If person means or the first component contain substantial response tendencies, the removal of a substantial first component would be somewhat misleading as to the major psychometric properties of the scale. Inasmuch as multidimensional scaling provides a solution which essentially removes the first component, the finding in this investigation of a one-dimensional configuration represents what exists once the person means or first component have been removed. The question remains, however, whether these person means or first component are saturated with response bias; which is important when considering that the retention of the raw score format was the best final solution. At issue then is whether the hierarchial scale of life events, experiences and perceptions presented in this investigation (and which include the person means or first component) is embedded with a massive response tendency. While such a matter can not be entirely ruled out, the relationship to standard response bias indicators appears very minimal. Correlations across a wide number of indicator variables (previously described in Chapter Three) are minor and not statistically significant. As such, the current available evidence on the magnitude scaling of 270 life events, experiences, and perceptions indicates that at least the standard response biases as well as participants reactions to the completion of the inventory are not at issue.

CHAPTER VI

LIMITATIONS AND IMPLICATIONS

6.1 Limitations

A limitation of this proposed research pertains to the testing of the efficacy of multidimensional magnitude scaling on the same sample of research participants as that used to determine the scalar products. Cross referent samples, of course, are preferred for such a test. Two reasons are offered for not having followed this route at the present time: Firstly, in as much as this research was a major preliminary study of a substantive problem in the literature, subsequent revision of the inventory - both in terms of deletion and addition of further items - is anticipated. It would have been inefficient to have launched a major second study with an inventory that will undergo immediate revision. Secondly, although the test of multidimensional scaling was performed on concommitant data, the same data comprised the linear portion for the test of efficacy. As such, though the possibility of chance factors coalescing between scalar products and substance use exists, the same chance factors existed between the linear and substance use condition. In this sense, both conditions (multidimensional magnitude and linear models) were tested on the same data. The question arises, however, whether the statistical manipulations in multidimensional magnitude scaling exacerbate the possible coalescence of chance factors. No apriori statistical reason is known why such should automatically occur beyond the same equivalency of chance factors existing

in the linear condition. Also, in light of the one-dimensional solution, the coalescence of scalar products is only a curious issue because the multidimensional scaling solution, in this case, is essentially equivalent to the raw value correlation.

6.2 Implications

The proposed research did not purport to circumvent all the specific problems identified in the myriad of studies in the literature on life events. Methodological problems in social science research are, of course, not new; many of the weaknesses identified in individual studies within the literature on life events could have been surmounted had the respective researchers taken more care in designing their investigations. Nonetheless, the major problems identified in the literature on life events and stress were addressed in the study; many of the minor problems discussed in the literature can be subsumed under the major issues in that much of the methodological problems that appear are either directly or indirectly related to the accuracy of the data. No amount of care, however, in research design (Campbell & Stanley, 1966; Cook & Campbell, 1979) can rectify poor data. Accurate data is primarily a measurement issue, and it is to this aspect that the proposed research was focused. Success in surmounting this major issue represents a critical contribution to the literature on life event stress and its associated strain(s). Taken overall, the study produced a magnitude scale of the realities and exigencies of life with consistent structure. The non-generalizability across parallel groups of stimuli indicates a high degree of stimulus specificity and,

argues strongly for the construction of a typology of persons. Such a typology is also apt to assist in the condensation of the plethora of approaches to life strain, which as suggested by this study, are likely redundant.

Replication of any scientific finding is, of course, mandatory. Should the finding in this study (that the strain in life events, experiences, and perceptions is best represented in parsimonious structure) prove to be stable, the significance to both methodology and choice of clinical intervention is profound. More specifically, what this finding infers in relation to the existing stress/strain paradigm is that the numerous factors and relationships thought to be already identified within the stress/strain dynamic has been somewhat superfluous, if not artifactual as well; and, rather than continue the expansion of divergent theories, concentration on the convergent conceptions of the stress/strain dynamic is predicted to be more productive since it appears that the life experience data essentially rests in a highly convergent structure(s). By extension, a moratorium on the proliferation of theories of stress and strain, corresponding diagnostic categories as well as the proliferation of matching therapies and intervention strategies appears in order. As well, in as much as strain permeates as well as supplies much of the impetus for many individuals to seek help for a wide variety of life issues, an analogous moratorium on the proliferation of general theories across the entire therapeutic enterprise is germane. The alert of redundancy in diagnostic categories in the general therapeutic enterprise has already been sounded many years ago (Stuart, 1970). However, if the progression in the increase in diagnostic categories continues, DSM-IV (anticipated in 1992) will have 400 or so categories (Millon & Klerman,

1986), though Mount (1989), among others, have questioned whether "... all these finer and more precise diagnoses have any basis in empirical validity" (p. 2). Similarly, questions raised by Fiedler (1950) nearly 40 years ago as to the efficacy among therapies have received little answer as yet, though the number of therapies (Herink, 1980) continues to expand.

A second impact accompanying a shift in paradigm toward parsimony pertains to a change in the definition of what constitutes the issue for which the therapeutic relationship is created. Condensation of the plethora of existing therapies (most of which are of unproven efficacy) is consistent with the scientific expectation of a parsimonious solution(s) as has already been shown to exist in other scientific disciplines. An example of a robust paradigm, prototypic of the direction toward which parsimony in intervention strategies might shift, is the type of restructuring of the problem-solving process for addictions programming which has been inductively derived by Parliament (1989). In her framework, addiction is not conceptualized as the predisposing problem of the addict, but reflects only one strategy (albeit not the most desirable) for solving one's problem of reaction to an issue. Observation of the use of this paradigm with rather chronic and intractable drug addicts (currently under incarceration) indicates the problem-solving format has a striking attractiveness to them. The fact that these clientele who have had involvment with several conventional intervention strategies (all of which have been essentially unsuccessful) respond to the problem-solving format underscores the potential utility for this straight-forward paradigm. In its basic form, the intervention is focused on seeking more efficient-productive ways for solving the addict's

problem (Parliament, 1989) rather than deciphering the entanglements of a problem or enforcing the often curious procedures associated with diverse therapies, all of which attempt to solve the same phenomenological issue.

A critical ingredient of this type of intervention is the neutralization of the highly questionable practice of power brokerage characteristically embedded in theoretical conceptualizations and ambiguous procedures which are virtually unassailable by the lay client. Moreover, such therapies are typically insulated by mystical formulations which are easily protected by regulations against ethical malpractice for those not sanctioned in the technique. Freed of encumbrances of a format which questions the competence and/or integrity of the client, a straight-forward, problem-solving paradigm is particularly robust in addressing the redundancy in existing therapies for the host of those problems in living that can be ameliorated by choices of the client, and which may include a physiological solution(s). Precursors for such a shift in the paradigm of intervention have been articulated by, among others, Freud (1926) in The Question of Lay Analysis, Fromm (1950) in Psychoanalysis and Religion, and Fiedler (1969). Consideration of individual issues in terms of a straight-forward, problem-solving framework which is focused on addressing the individual's strategy for solving the problem, rather than the entanglements of the problem, is sufficiently robust to have applicability to numerous problematic issues in the lives of individuals. Reframing of many of the individual problems in living into a problem-solving paradigm shifts the task of intervention to finding more efficient and productive ways of dissolving a difficulty or issue (Parliament, 1989), rather than iteratively attempting to decipher the

puzzling properties of a problem, untangle curious notions of etiology, or become credentialed in the therapeutic techniques of what is primarily esoteric activity. In that the results of this study only reflect responder perceptions of life strain, the relevance of life strain in the etiology or exacerbation of various illnesses is not addressed. Notwithstanding that life strain may be a factor in various maladies (Dorian & Garfinkel, 1987), the applicability of the myriad of existing therapies would still be redundant even in this circumstance. Summarily, the review of the stress/strain as well as the life event literature indicated a need for a shift in paradigm, and the findings of this investigation suggest that such a shift of the paradigm be in the direction of parsimony.

Further to the construction of a typology of persons, a more comprehensive mapping of the life event, experience and perception area is warranted. As well, replication of the structural properties of the magnitude scaling of such stimuli is essential prior to the delineation of any coalescing or concomitant characteristics associated with perceived strain. Given further indications of stable structural properties, the development of norms across age and other demographic variables would be an important addition to comparing subsequent research findings. Examination of relationships between perceived strain and the actual histories of encounter with the events would also be useful to understanding the etiology and impact of stress and the accompanying strain. As well, an investigation of magnitude estimation across different modalities would assist the understanding of the reliability and validity of magnitude and multidimensional scaling in the realities and exigencies of life.

Additional research could investigate stimuli of similar magnitude value through a paired comparison design to verify equivalence of smaller sets of stimuli. An extended study on strain associated with non-physical etiology as compared to physical associated etiology has particular relevance to the development of possible interventions that ameliorate symptoms. Successful progress in these research components would facilitate the eventual design of prospective studies, which are essential to the study of stress and strain in terms of causality. Replication studies of findings derived from such research is, of course, mandatory.

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APPENDIX

Table A.1 Inventory of Life Events, Experiences and Perceptions

Listed below are a number of things, life events, and human conditions which may, according to varying degrees of intensity, cause stress, fear, concern, or upsetedness to a person. Please rate these items as to their relative degree of stress or concern to you personally.

In rating these items consider the following mechanics of rating: Item 1, Appendectomy (surgical removal of the appendix) has been assigned an arbitrary value of 500. As you complete this list consider whether each event, condition or thing is more or less stressful to you personally than an Appendectomy. If you decide the item is more intense, then choose a proportionally larger number and place it on the blank directly opposite in the column marked "VALUE". If you decide that the item is less stressful than an Appendectomy, then indicate how much less by placing a proportionally smaller number in the "VALUE" column. If the item is of equal intensity to an Appendectomy, record the number 500 opposite the item.

Please score these events, conditions and things according to your own personal reactions. Thank you for participating in this research.

	ITEM	VALUE
1.	Appendectomy	
2.	Serious illness	
3.	Terminal illness	
4.	Loneliness	
5.	Death of a spouse or mate	
6.	Snakes	
7.	Aging	
8.	Criticism	
9.	Disfiguration	
10.	Rejection shown toward you from a loved one	
11.	Minor handicap	
12.	Major handicap	
13.	Isolation from others	
14.	Fate (that things happen as they do to oneself)	
15.	Fate (that things happen as they do to others)	
16.	Responsibility	
17.	Death of a stranger	
18.	Injustice (done to you	
19.	Drowning	
20.	Seeing another person being rejected	
21.	Change	
22.	Death of my father	
23.	Emptiness (feeling empty)	
24.	Rejection shown toward you from your mother	
25.	Meaninglessness	
26.	To reject oneself	
27.	Death of one's child	
28.	Minor law infraction	
29.	Serious law infraction	
30.	Condemnation of oneself	
31.	Fired from job	
32.	Outstanding achievement (self)	

33. Public speaking _____
34. Retirement _____
35. Condemnation of another _____
36. Physical pain _____
37. Rejection shown toward you from a stranger _____
38. Boredom with spouse or mate _____
39. Boredom with life _____
40. Insects _____
41. My own death _____
42. Ridicule _____
43. Rejection shown toward you from brothers and sisters _____
44. Guilt over something not done _____
45. Guilt over something done _____
46. Purposelessness _____
47. Rejection shown toward you by your father _____
48. Aloneness _____
49. Death of a brother or sister _____
50. Height (high altitude) _____
51. Suffering _____
52. Injustice (done to others) _____
53. Rejection by one's child _____
54. Death of my mother _____
55. Child abuse _____
56. Confinement in prison _____
57. Loss of personal freedom _____
59. Emotional pain _____
60. Anger _____
61. Hostility _____
62. Winning a big lottery _____
63. Fatigue _____
64. Shame _____
65. Meeting one's ideal person _____
66. Divorce _____
67. Intense joy _____
68. Loss of significant income _____
69. Mortgage over $50,000. _____
70. Leprosy _____
71. Rape of a female known to you _____
72. Rape of a female unknown to you _____
73. Kidney failure _____
74. Minor heart attack _____
75. Major heart attack _____
76. Mastectomy of female family member _____
77. Psychiatric illness (self) _____
78. Psychiatric illness (family member) _____
79. Psychiatric illness (acquaintance) _____
80. Psychiatric illness (stranger) _____
81. Major depression _____
82. Lung cancer _____
83. Kindness shown to you from a family member _____
84. Kindness shown to you from an acquaintance you like _____
85. Kindness shown to you from an acquaintance you dislike _____
86. Kindness shown to you from a stranger _____
87. Kissing someone you like in public _____
88. Someone you like kissing you in public _____
89. Being kissed by someone _____
90. Full moon _____
91. Receiving an expensive present from another who you did not buy a present for _____
92. Receiving an expensive present from someone you like _____

93. Receiving an expensive present from someone you don't want to become involved with ____
94. Someone sexually molesting an elderly person ____
95. Sexual molesting of a child by a family member ____
96. Sexual molesting of a child by a stranger ____
97. Stroke ____
98. Brain tumour ____
99. Need for neurosurgery ____
100. Minor stroke ____
101. Major stroke ____
102. Minor, temporary paralysis ____
103. Major, temporary paralysis ____
104. Minor, permanent paralysis ____
105. Major, permanent paralysis ____
106. Situation of physical danger ____
107. Situation requiring personal courage ____
108. Situation requiring moral courage ____
109. Truth that is unpopular with society ____
110. Cemetery ____
111. Gravesite of family member ____
112. Gravesite for oneself ____
113. Shortage of food for strangers ____
114. Shortage of food for acquaintance ____
115. Shortage of food for family members ____
116. Shortage of food for oneself ____
117. Eating alone ____
118. Being without money while having more debts ____
119. Ghosts ____
120. Dieting ____
121. Obesity ____
122. Being a little over-weight ____
123. Being a lot overweight ____
124. Someone exaggerating your qualities in public ____
125. Testifying in court on major crime. ____
126. Fighting with serious words with another ____
127. Displays of anger in public ____
128. Someone yelling at you ____
129. Yelling at another person ____
130. Admonishment from one's work supervisor ____
131. Alien creatures ____
132. Bad odor ____
133. The sweet odor of food ____
134. Seeing someone severely drunk ____
135. Temptation for a habit one is trying to break ____
136. Tobacco smoke ____
137. Jogging ____
139. Making an acceptance speech for an award ____
140. Cold weather ____
141. Snow ____
142. A lengthy rain ____
143. Continuous high winds ____
144. Having to make something creative ____
145. Someone lying to you ____
146. Telling a fib to someone ____
147. Being stopped by a policeman ____
148. The coming of the Lord ____

149. Satan _____
150. Sasquatch _____
151. Big foot _____
152. Being on a diet _____
153. Sight of a mouth-watering food _____
154. The food experience _____
155. Blind date _____
156. Being approached for money _____
157. Speeding above posted speed limit _____
158. Speeding on a freeway at 90 or more miles per hour _____
159. Flying in a small aircraft _____
160. Having a joke told on oneself _____
161. People snickering at me _____
162. Someone talking about me "behind my back" _____
163. Having a joke told on another _____
164. Going to a large family reunion _____
165. Attending a major festival _____
166. Someone trying to make a fool of me _____
167. Falling off a diet _____
168. Police following your car while driving _____
169. Alcohol _____
170. Tobacco _____
171. Vomit _____
172. Dirty diapers of family member _____
173. Nausea _____
174. Pursued by attractive member of opposite sex _____
175. Pursued by attractive member of same sex _____
176. Speaking on radio _____
177. Speaking before fellow acquaintances _____
178. Speaking at a conference _____
179. Speaking on television _____
180. Trying foreign food _____
181. Finding ecstasy _____
182. Cruise missile _____
183. War with another country _____
184. Accused of something you did _____
185. Accused for something you didn't do _____
186. Expressing affection to loved one in public _____
187. Burnout (own) _____
188. Winning of a game of chance _____
189. Doing an intelligence test _____
190. Eating alone in public _____
191. Driving across a high bridge _____
192. Going for a test for serious medical problem _____
193. Being too tired _____
194. Being jilted by a loved person _____
195. Breaking up with a boyfriend or girl-friend _____
196. Flying in a large airplane _____
197. Horseback riding _____
198. Being out in a storm on a lake _____
199. Out in the woods alone _____
200. Catching a big fish _____
201. Riding horseback _____
202. Sky diving _____
203. Losing control of one's emotion _____
204. Not enough sleep for more than two days _____
205. Waking up in the morning by 7 o'clock _____

206. Sitting for an important exam _____
207. Power outage at home _____
208. Being sued _____
209. Visit a medical doctor _____
210. Visit a psychiatrist _____
211. Insomnia _____
212. Going on a holiday _____
213. Attending a funeral _____
214. Getting married _____
215. Going on the space shuttle _____
216. Being evaluated at one's work _____
217. Missing a regular meal _____
218. Disciplining oneself _____
219. Acne _____
220. Epilepsy _____
221. Having serious brain damage _____
222. Loss of an arm _____
223. Blindness _____
224. Deafness _____
225. Loss of a leg _____
226. Not getting an opportunity to succeed in social circumstances _____
227. Truth - minor issue _____
228. Truth - major issue _____
229. Being too thin _____
230. Being too fat _____
231. Courage of one's convictions _____
232. Being afraid _____
233. Wishy-washiness in oneself _____
234. Wishy-washiness in others _____
235. Moving to another city _____
236. Going to work _____
237. Seeing a loved one _____
238. Seeing a loved one hungry _____
239. Seeing a loved one sad _____
240. Not having good clothes _____
241. Being overweight _____
242. A stranger smiling at you _____
243. Someone abusing an animal _____
244. Xeroxing 50 pages _____
245. Reading a Romance Novel _____
246. Reading a book in Psychology _____
247. Reading a book in Engineering _____
248. A nuclear war _____
249. A volcanic eruption of the continent _____
250. A major earthquake within 100 miles of here _____
251. Eating a bowl of strawberries _____
252. Picking potatoes for 3 hours _____
253. Being drunk _____
254. Use of aspirin _____
255. Use of heroin _____
256. Use of marijuana _____
257. Use of tobacco _____
258. Use of alcohol _____
259. Use of medication _____
260. Flooded basement at home _____
261. Blocked toilet in my own home _____
262. World War II _____
263. The Black Death _____
264. World War I _____
265. Glacier avalanche with significant loss of life _____
266. Major earthquake with significant loss of life _____
267. Fungicide poisoning with significant loss of life _____
268. Nuclear reactor problems _____
269. Poisoning in waste disposal _____
270. Sinking of the Titanic _____

Table A.2. Inventory of Substances

How often do you use the following:

		NEVER	ONCE EVERY FIVE YEARS	ABOUT ONCE A YEAR	A FEW TIMES A YEAR	MONTHLY	TWICE A YEAR	WEEKLY	EVERY COUPLE OF DAYS	ONCE A DAY	SEVERAL TIMES A DAY
1.)	alcohol	1	2	3	4	5	6	7	8	9	10
2.)	tobacco	1	2	3	4	5	6	7	8	9	10
3.)	tea (herbal)	1	2	3	4	5	6	7	8	9	10
4.)	tea (caffeinated)	1	2	3	4	5	6	7	8	9	10
5.)	coffee	1	2	3	4	5	6	7	8	9	10
6.)	coffee (decaffeinated)	1	2	3	4	5	6	7	8	9	10
7.)	junk food	1	2	3	4	5	6	7	8	9	10
8.)	chocolate	1	2	3	4	5	6	7	8	9	10
9.)	health foods	1	2	3	4	5	6	7	8	9	10
10.)	amphetamines	1	2	3	4	5	6	7	8	9	10
11.)	sleep medication	1	2	3	4	5	6	7	8	9	10
12.)	marijuana	1	2	3	4	5	6	7	8	9	10
13.)	hashish	1	2	3	4	5	6	7	8	9	10
14.)	antidepressants	1	2	3	4	5	6	7	8	9	10
15.)	tranquilizers	1	2	3	4	5	6	7	8	9	10
16.)	vitamins	1	2	3	4	5	6	7	8	9	10
17.)	mineral supplements	1	2	3	4	5	6	7	8	9	10
18.)	PCP (angel dust)	1	2	3	4	5	6	7	8	9	10
19.)	special supplements	1	2	3	4	5	6	7	8	9	10
20.)	peyote	1	2	3	4	5	6	7	8	9	10
21.)	LSD	1	2	3	4	5	6	7	8	9	10
22.)	morphine	1	2	3	4	5	6	7	8	9	10
23.)	cocaine	1	2	3	4	5	6	7	8	9	10
24.)	mescaline	1	2	3	4	5	6	7	8	9	10
25.)	heroin	1	2	3	4	5	6	7	8	9	10
26.)	special psychiatric (such as lagactil, haldol, halcion, chlor-promazine, mellaril)	1	2	3	4	5	6	7	8	9	10
27.)	aspirin	1	2	3	4	5	6	7	8	9	10
28.)	codeine	1	2	3	4	5	6	7	8	9	10
29.)	pain killers	1	2	3	4	5	6	7	8	9	10
30.)	sniff solvents	1	2	3	4	5	6	7	8	9	10
31.)	an elixir (for what ails you)	1	2	3	4	5	6	7	8	9	10

32.) laxatives	1	2	3	4	5	6	7	8	9	10
33.) antihistamines	1	2	3	4	5	6	7	8	9	10
34.) antibiotics	1	2	3	4	5	6	7	8	9	10
35.) nasal decongestants	1	2	3	4	5	6	7	8	9	10
36.) cough medicine	1	2	3	4	5	6	7	8	9	10

Table A.3 Response Means, Standard Deviations and Ranges of 36 Substance Use Items

	Item	Mean	S.D.	Range	N
1.	alcohol	5.069	2.508	9	303
2.	tobacco	3.766	3.907	9	299
3.	tea (herbal)	4.109	2.817	9	294
4.	tea (decaffeinated)	5.207	3.292	9	295
5.	coffee	6.391	3.665	9	297
6.	coffee (decaffeinated)	3.860	3.164	9	300
7.	junk food	6.799	1.826	9	303
8.	chocolate	6.199	1.637	9	302
9.	health foods	5.530	2.899	9	302
10.	amphetamines	1.343	1.122	8	303
11.	sleep medication	1.441	1.260	8	304
12.	marijuana	1.911	1.730	9	304
13.	hashish	1.497	1.216	8	304
14.	antidepressants	1.270	1.129	8	304
15.	tranquilizers	1.218	0.969	8	303
16.	vitamins	5.479	3.084	9	303
17.	mineral supplements	3.372	3.131	9	301
18.	PCP (angel dust)	1.020	0.293	5	303
19.	special supplements	1.681	1.895	9	301
20.	peyote	1.036	0.285	3	304
21.	LSD	1.063	0.314	3	304
22.	morphine	1.007	0.081	1	304
23.	cocaine	1.102	0.501	4	303
24.	mescaline	1.043	0.306	3	304
25.	heroin	1.003	0.057	1	304
26.	special psychiatric (such as) largactil, haldol, halcion, chlorpromazine, mellaril)	1.132	0.795	8	295
27.	aspirin	4.525	1.818	9	301
28.	codeine	2.106	1.708	9	302
29.	pain killers	2.308	1.624	8	299

30.	sniff solvents	1.069	0.380	3	303
31.	an elixir (for what ails you)	1.351	0.986	6	302
32.	laxatives	1.923	1.567	8	298
33.	antihistamines	2.611	1.801	9	298
34.	antibiotics	2.867	1.413	9	300
35.	nasal decongestants	2.470	1.575	9	304
36.	cough medicine	3.115	1.346	9	304

Table A.4 List of Stimulus Incident (INCD) Items for Item Groups A, B,C and Composite Item Group D for Multidimensional Trials

Life Event, Experiences and Perception Items

Group A[a]	Group B[b]	Group C[c]	Group D[d]
INCD022	INCD003	INCD005	INCD005
INCD027	INCD049	INCD054	INCD027
INCD105	INCD019	INCD223	INCD105
INCD082	INCD075	INCD098	INCD075
INCD225	INCD224	INCD221	INCD221
INCD222	INCD012	INCD248	INCD012
INCD055	INCD056	INCD041	INCD041
INCD070	INCD057	INCD066	INCD070
INCD071	INCD095	INCD077	INCD095
INCD097	INCD096	INCD099	INCD099
INCD103	INCD104	INCD101	INCD103
INCD249	INCD002	INCD010	INCD002
INCD047	INCD024	INCD053	INCD024
INCD074	INCD078	INCD073	INCD073
INCD183	INCD094	INCD115	INCD183
INCD250	INCD009	INCD029	INCD250
INCD069	INCD068	INCD031	INCD031
INCD076	INCD100	INCD081	INCD076
INCD106	INCD215	INCD118	INCD106
INCD013	INCD011	INCD255	INCD255
INCD036	INCD038	INCD018	INCD038
INCD051	INCD039	INCD043	INCD043
INCD058	INCD059	INCD062	INCD058
INCD102	INCD079	INCD107	INCD079
INCD125	INCD116	INCD108	INCD108
INCD194	INCD185	INCD195	INCD185
INCD220	INCD208	INCD214	INCD214
INCD238	INCD267	INCD268	INCD238

INCD052	INCD175	INCD030	INCD175
INCD192	INCD004	INCD179	INCD192
INCD020	INCD023	INCD016	INCD023
INCD065	INCD026	INCD032	INCD032
INCD067	INCD072	INCD109	INCD067
INCD126	INCD123	INCD114	INCD114
INCD148	INCD130	INCD178	INCD130
INCD182	INCD202	INCD187	INCD182
INCD243	INCD226	INCD239	INCD239
INCD269	INCD265	INCD266	INCD265
INCD042	INCD033	INCD025	INCD025
INCD046	INCD045	INCD048	INCD045
INCD060	INCD064	INCD061	INCD060
INCD093	INCD111	INCD112	INCD093
INCD128	INCD113	INCD127	INCD127
INCD139	INCD135	INCD129	INCD129
INCD145	INCD162	INCD149	INCD145
INCD176	INCD166	INCD184	INCD166
INCD199	INCD203	INCD198	INCD203
INCD204	INCD206	INCD213	INCD204
INCD230	INCD216	INCD228	INCD228
INCD235	INCD241	INCD232	INCD241
INCD256	INCD121	INCD035	INCD256
INCD263	INCD260	INCD044	INCD044
INCD006	INCD008	INCD007	INCD006
INCD015	INCD014	INCD021	INCD014
INCD034	INCD028	INCD050	INCD028
INCD063	INCD083	INCD084	INCD063
INCD092	INCD091	INCD085	INCD085
INCD124	INCD136	INCD134	INCD124
INCD146	INCD147	INCD138	INCD147
INCD158	INCD155	INCD156	INCD156
INCD168	INCD161	INCD159	INCD159
INCD177	INCD210	INCD174	INCD210
INCD211	INCD231	INCD227	INCD211
INCD253	INCD233	INCD240	INCD240
INCD257	INCD161	INCD262	INCD257

INCD080	INCD264	INCD143	INCD264
INCD171	INCD234	INCD189	INCD171
INCD037	INCD017	INCD040	INCD017
INCD088	INCD086	INCD087	INCD087
INCD117	INCD110	INCD089	INCD089
INCD120	INCD122	INCD119	INCD122
INCD131	INCD132	INCD133	INCD131
INCD137	INCD141	INCD140	INCD137
INCD144	INCD142	INCD150	INCD142
INCD144	INCD142	INCD150	INCD142
INCD153	INCD152	INCD151	INCD151
INCD160	INCD154	INCD157	INCD157
INCD163	INCD164	INCD165	INCD163
INCD169	INCD170	INCD167	INCD170
INCD180	INCD173	INCD172	INCD172
INCD186	INCD181	INCD188	INCD181
INCD190	INCD191	INCD193	INCD190
INCD196	INCD200	INCD197	INCD196
INCD205	INCD207	INCD201	INCD207
INCD217	INCD209	INCD212	INCD212
INCD219	INCD218	INCD229	INCD218
INCD236	INCD237	INCD242	INCD236
INCD247	INCD252	INCD246	INCD252
INCD270	INCD258	INCD259	INCD259
INCD245	INCD244	INCD090	INCD090
INCD251		INCD254	INCD251

[a] All stimulus coordinate values are 0.1060 except item INCD148 which is -9.4340.

[b] All stimulus coordinate values are 0.1066 except item INCD057 which is -9.3808.

[c] The stimulus coordinate values in descending sequence are as follows: item INCD005 = -0.0266; item INCD054 = -0.0308; item INCD223 = -0.0264; items INCD098 and INCD221 = -0.0263; item INCD248 = 0.0098; item INCD041 = 6.6976; items INCD066 through INCD099, INCD0101 through INCD118, and INCD018 through INCD129 =0.0160; items INCD101 and INCD255 = 0.0159; item INCD149 = -6.7174; and items INCD184 through INCD254 = -0.0099.

[d] All stimulus coordinate values are -0.1060 except item INCD041 which is 9.4340.

Table A.5 List of Reaction Questions

A. The fact that many items revolved around only a few topics was: (1) okay with you, (2) didn't matter one way or another, (3) was disagreeable with you.

B. How did you feel when you were answering these questions: (Please circle one number).

interested	1 2 3 4 5 6 7	bored
not bothered by them	1 2 3 4 5 6 7	annoyed
curious	1 2 3 4 5 6 7	apathetic
cooperative	1 2 3 4 5 6 7	hostile
undisturbed by them	1 2 3 4 5 6 7	anxious
frank, candid, open	1 2 3 4 5 6 7	cautious, guarded
alert	1 2 3 4 5 6 7	tired